Vol. 20, No. 4
April 1995

Energy Research Abstracts

Abstracts 7087-9199

Office of Scientific and Technical Information
UNITED STATES DEPARTMENT OF ENERGY

The Office of Scientific and Technical Information

The Office of Scientific and Technical Information (OSTI) in Oak Ridge, Tennessee, provides direction for the Department of Energy's scientific and technical information (STI) program and maintains a centralized base of support to assist Departmental elements in planning, developing, and implementing STI activities. DOE-originated and worldwide literature and software on advances in subjects of interest to DOE researchers are collected, processed, and disseminated using computerized databases, publications, and other media.

This information collection, containing over three million citations, represents a major national resource of scientific and technical information. In addition to information from DOE and its contractors, DOE acquires information through its international partnerships with the International Energy Agency's Energy Technology Data Exchange (ETDE), a consortium comprised of members from North America and Europe, Japan and Korea; the International Atomic Energy Agency's International Nuclear Information System, representing 80 countries; bilateral agreements with foreign governments; exchange agreements with other U.S. government agencies; and contracts with private information organizations and professional societies.

The subject scope of this information extends beyond energy, covering basic scientific studies in such areas as radiology, atomic and nuclear physics, radiation and nuclear chemistry, superconductivity, supercomputers, the environment, health and safety, waste management, nuclear medicine, and arms control.

Major DOE databases are available within the United States through DIALOG Information Services and STN International and outside the United States through formal governmental exchange agreements. DOE and DOE contractor offices can access the databases online through the Integrated Technical Information System (ITIS) maintained by OSTI.

UNITED STATES DEPARTMENT OF ENERGY
Office of Scientific and Technical Information
Post Office Box 62
Oak Ridge, Tennessee 37831

International Copyright, © U.S. Department of Energy, 1995, under the provisions of the Universal Copyright Convention.
United States copyright is not asserted under the United States Copyright Law, Title 17, United States Code.

Vol. 20, No. 4
April 1995
ISSN: 0160-3604
CODEN: ERABDZ

Energy Research Abstracts

Coverage

Energy Research Abstracts (ERA) provides abstracting and indexing coverage of all scientific and technical reports and patent applications originated by the U.S. Department of Energy, its laboratories, energy centers, and contractors, as well as theses and conference papers and proceedings issued by these organizations in report form. Audiovisual materials, computer media (magnetic tapes, diskettes, etc.), and engineering drawings are included in this definition. *ERA* also covers other energy information prepared *in report form* by federal and state government organizations, foreign governments, and domestic and foreign universities and research organizations, *provided* that the full text of the document has been received by OSTI. Foreign report information is obtained through the International Energy Agency's 18-nation Energy Technology Data Exchange, the International Atomic Energy Agency's International Nuclear Information System, or nation-to-nation agreements. The purpose of this publication is to announce documents produced or obtained by DOE that are not so readily available as journal articles, books, or patents.

Scope

The scope of *ERA* encompasses DOE's research, development, demonstration, and technology programs resulting from its broad charter for energy sources, supplies, safety, environmental impacts, and regulation.

The citations presented in *ERA* are available for online searching as records within the Energy Science and Technology Database (EDB). The current-year records are available on the Integrated Technical Information System (ITIS).

Availability

DOE and DOE contractors can obtain *ERA* (regular issues and annual indexes) by using VISA, MasterCard, or OSTI deposit accounts. Contact the Office of Scientific and Technical Information, P.O. Box 62, Oak Ridge, TN 37831, Attention: Information Services. For further information, call (615)576-8401. *ERA* is also available at authorized GPO Depository Libraries. (List is provided on the inside back cover.)

ERA (regular issues and annual indexes) is available to the public on a subscription basis from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Managing Editor, Leota S. Kane
Technical Editor, Barry C. Steele

Information Sources

The citations presented in *Energy Research Abstracts* are a subset of the worldwide energy information provided to the Office of Scientific and Technical Information (OSTI) through exchange agreements with foreign sources and through exchanges or contracts with U.S. organizations.

The **Energy Technology Data Exchange (ETDE)** was established by the International Energy Agency to promote cooperation among members in conducting appropriate energy-related research and development programs through the development of a formal central information sharing system. In accomplishing the objectives of the ETDE, members select, abstract, and index relevant research information published in their countries in accordance with Exchange standards. OSTI serves as the central receiving and processing center for this information, which it then disseminates to national centers in the participating countries. The following countries are currently members of the ETDE:

Australia	Norway
Brazil	Poland
Canada	Republic of Korea
Denmark	Spain
Finland	Sweden
France	Switzerland
Germany	The Netherlands
Italy	United Kingdom
Japan	United States

The **International Nuclear Information System (INIS)** was established to promote the exchange of information on nuclear science and technology. Its operation is similar to that of the ETDE, with the INIS Secretariat being located in Vienna, Austria. Currently, 79 countries and 15 international organizations are members of INIS. OSTI serves as the INIS national center for the United States.

In the exercise of its rights and responsibilities under the agreements to which it is a party, the **Office of Scientific and Technical Information** both receives information from the above sources and submits U.S.-produced information to them. In addition to materials generated by the Department of Energy, this U.S.-produced information is gathered from other government agencies as well as under contract with private information processing companies. All input is computer processed and entered into a database for online retrieval. The database serves as well for the production of numerous OSTI publications.

How To Read A Citation

The principal data elements included in these citations are:

1. **Abstract number** within volume.
2. **Report number** identification for report-type literature.
3. **Title and subtitle** (non-English title may appear in parentheses, if applicable).
4. **Author(s).** First 10 names in the data record are printed, then "et al." is listed.
5. **Author affiliation.** Only first one is listed, in parentheses after author(s) to which it applies.
6. **Collaboration,** if present.
7. **Corporate author(s)** identifying corporation responsible for document.
8. **Date of publication.** If not known, a processing date is in brackets.
9. **Number of pages** or page range. Prices are based on total pages unless special pricing applies.
10. **Language** of document if non-English.
11. **Monograph title** if citation is an analytic (part, chapter, or paper) of a larger monograph.
12. **Sponsoring organization.**
13. **Contract or grant number.**
14. **Secondary identifying number;** may be a conference number.
15. **Conference title, location, and date,** if applicable.
16. **Order number.** The "DE" order number may be used for ordering from NTIS or OSTI, as appropriate. The "TI" prefix is valid only at OSTI.
17. **Sources of availability** from which a copy of the document may be obtained; usually appear as abbreviations. (See information on following page.)
18. **Drop note** or explanatory statement.
19. **Abstract.**
20. **Subject descriptors.** Listed only if no abstract or only a brief statement is included.

Sample Citations

Report

18494 (DOE/ER/40438–T1) **[Development of a hydrogen and deuterium polarized gas target for application in storage rings]: Progress report.** Haeberli, W. Phys. VI collaboration. Wisconsin Univ., Madison (USA). Dept. of Physics. [1989]. 12p. Sponsored by DOE Energy Research. DOE Contract FG02-88ER40438. Order Number DE89007246. Available from NTIS, PC A03/MF A01 - OSTI; GPO Dep.

This paper briefly discusses the Wisconsin test facility for storage cells; results of target tests; the new UHV...

Report Analytic

18500 (INIS-SU—69, pp. 30-32) **Transition energies in Ne-like ions. Correlation effects.** Vainshtejn, L.A. AN SSSR, Moscow. Fizicheskij Inst. 1988. (In Russian). In *Experimental and theoretical physics. Collection.* Order Number DE89780060. Available from NTIS (US Sales Only), PC A03/MF A01; INIS.

Kratkie Soobshcheniya po Fizike.; no. 6.

SILVER IONS/energy-level transitions; XENON IONS/energy-level transitions; CORRELATIONS; D STATES; E STATES;...

54 (DOE/ER/60888-1-Vol.1, pp. 115-117) **Investigation of air pollution in house due to use of various fuels.** Luo, Dayu (Chengdu Sanitation (China)). Canada Mortgage and Housing Corp., Ottawa, ON (Canada). 1990. (CONF-900724-Vol.1: Indoor Air '90: 5th international conference on indoor air quality and climate, Toronto (Canada), 29 Jul - 3 aug 1990). In Indoor air '90: The fifth international conference on indoor air quality and climate. Volume 1: Final report. 786p. Order Number DE90017786. Source: NTIS.

Air pollution in houses caused by combustion of coal is more serious than that by combustion of natural gas and methane (primarily by SO_2 and NO_2). The gas concentration after cooking is higher than that before cooking, and it is higher in kitchen than in bedroom and outdoor. There were mutations in the extract from TSP in 30m^2 air in the bedroom, kitchen and outdoor, where coal and natural gas were used. The supernatant saliva activity of children whose family uses coal is significantly lower than that of pumping streams.

How To Order from the Availability Sources

TO OBTAIN A REPORT

Report literature, usually identified by an alphanumeric identifier at the beginning of a citation, is available from the sources listed in the citation (see example of element 2 on page iii). Often the sources are listed as abbreviations. Corresponding addresses are provided at right from which documents with these abbreviations may be ordered. When "OSTI" is given, **DOE and DOE contractors may order these documents from OSTI.** (However, check with your library or information organization which may require that orders go through them to OSTI.) OSTI prices are based on total pages unless special pricing applies. The public should order from NTIS or from one of the other agencies listed in the citation. NTIS price codes may continue to appear in some records. To expedite processing, an order form is provided in the back of this publication. NOTE: The order numbers provide quicker access for report ordering. Use the order number where possible.

GPO Superintendent of Documents
Government Printing Office
Washington, DC 20402

GPO Dep. Available for inspection or interlibrary loan at Government Printing Office regional depository libraries.

INIS *Available only in microfiche.*
INIS Clearinghouse
International Atomic Energy Agency
P.O. Box 100, A-1400
Vienna, Austria

NTIS U.S. Department of Commerce
Technology Administration
National Technical Information Service
Springfield, VA 22161

OSTI U.S. Department of Energy
Office of Scientific and Technical Information
P.O. Box 62
Oak Ridge, TN 37831
Fax: (615) 576-2865
e-mail: reports @adonis.osti.gov

ESTSC Energy Science and Technology Software Center
P.O. Box 1020
Oak Ridge, TN 37831-1020

CASI Attention: Document Order
NASA Center for AeroSpace Information
800 Elkridge Landing Road
Linthicum Heights, MD 21090-2934

How To Use the Indexes

Five indexes are provided for approaching the content of each issue of *Energy Research Abstracts*. Descriptions of entries in these indexes follow.

Corporate Author Index
The corporation, organization, or institution responsible for the issuance of the document is listed in this index. The entries are arranged alphabetically and provide the title and citation number of the reference. For example, the listing for the "Report" sample citation would appear as shown at right.

Wisconsin Univ., Madison (USA). Dept. of Physics
[Development of a hydrogen and deuterium polarized gas target for application in storage rings]: Progress report, 15:18494 (R;US)
Wisconsin Univ., Madison (USA). Lab. of Genetics
Organization of the R chromosome region in maize: Final progress report, June 1, 1983–May 31, 1986, 15:18255 (R;US)

Personal Author Index
Each author's name listed on a document cited in this issue is indexed. An index entry provides title and citation number; for secondary and other names, a cross-reference is given to the primary author name where the full index entry is located.

Hadley, D.L., *See* Lee, A.D., 15:17651
Haeberli, W., [Development of a hydrogen and deuterium polarized gas target for application in storage rings]: Progress report, 15:18494 (R;US)

Subject Index
This index lists the main subject descriptors assigned to each record by indexing professionals. A secondary or qualifier term is used where necessary to describe materials, objects, and processes. Document titles may be enhanced with additional informative phrases where necessary. An excerpt from this index appears at right.

HYDROGEN ISOTOPES
See also DEUTERIUM
HYDROGEN 4
TRITIUM
Neutron-Rich Isotopes
Study on the strong neutron-rich nuclei of lightest elements, 15:18686 (RA;SU;In Russian)

Contract Number Index
DOE technical reports are listed by contract number. Each entry also provides the primary corporation or organization cited for that contract number. A typical entry is shown.

FG02-88ER40438 **Wisconsin Univ., Madison (USA). Dept. of Physics**
15:18494 DOE/ER/40438–T1
FG02-88ER60664 **Rogers and Associates Engineering Corp., Salt Lake City, UT (USA)**

Report Number Index
Technical report literature is indexed by the alphanumerical identifier of the report. Patent documents and conferences are included for convenience. Each entry lists the citation number, the source of availability of the document, an indicator of presence at a GPO depository library, order number, and distribution category. A typical entry is:

DOE/ER/40438–T1 15:18494 NTIS, OSTI E 1.99: DE89007246 MF-411

Subject Contents

The subject content of *Energy Research Abstracts* is arranged as shown below. The two-digit and four-digit category numbers printed here illustrate the category number assignment used in the database records.* The following list includes all of the 38 first-level and the 313 second-level categories. Because each issue of *ERA* publishes citations only for those documents announced during the past semimonthly period, some subject categories may not be present in every issue.

Numerical Listing of Categories

01 COAL LIGNITE, AND PEAT
- 03 Preparation
- 04 Processing
- 05 Products and By-Products
- 06 Properties and Composition
- 08 Waste Management
- 09 Environmental Aspects
- 10 Reserves, Geology, and Exploration
- 20 Mining
- 30 Transport, Handling, and Storage
- 40 Combustion
- 50 Economic, Industrial, and Business Aspects
- 60 Health and Safety
- 70 Legislation and Regulations

02 PETROLEUM
- 02 Reserves, Geology, and Exploration
- 03 Drilling and Production
- 04 Processing
- 05 Products and By-Products
- 06 Health and Safety
- 07 Economic, Industrial, and Business Aspects
- 08 Waste Management
- 09 Environmental Aspects
- 10 Legislation and Regulations
- 20 Transport, Handling, and Storage
- 30 Properties and Composition
- 50 Combustion

03 NATURAL GAS
- 02 Reserves, Geology, and Exploration
- 03 Drilling, Production, and Processing
- 04 Products and By-Products
- 05 Health and Safety
- 06 Economic, Industrial, and Business Aspects
- 07 Waste Management
- 08 Environmental Aspects
- 10 Legislation and Regulations
- 20 Transport, Handling, and Storage
- 30 Properties and Composition
- 40 Combustion

04 OIL SHALES AND TAR SANDS
- 02 Reserves, Geology, and Exploration
- 03 Drilling, Fracturing, and Mining
- 04 Oil Production, Recovery, and Refining
- 05 Properties and Composition
- 06 Products and By-Products
- 07 Health and Safety
- 08 Economic, Industrial, and Business Aspects
- 09 Waste Management
- 10 Environmental Aspects
- 20 Legislation and Regulations
- 30 Transport, Handling, and Storage
- 40 Combustion

05 NUCLEAR FUELS
- 01 Reserves, Exploration, and Mining
- 04 Feed Processing
- 05 Uranium Enrichment
- 07 Fuels Production and Properties
- 08 Spent Fuels Reprocessing
- 09 Transport, Handling, and Storage
- 10 Economic, Industrial, and Business Aspects
- 20 Waste Management
- 30 Environmental Aspects
- 40 Health and Safety
- 50 Safeguards, Inspection, and Accountability
- 60 Legislation and Regulations

07 ISOTOPE AND RADIATION SOURCE TECHNOLOGY
- 01 Physical Isotope Separation
- 02 Radiation Sources
- 03 Isotopic Power Supplies
- 04 Economic, Industrial, and Business Aspects
- 05 Health and Safety
- 06 Environmental Aspects
- 07 Regulation and Licensing

08 HYDROGEN
- 01 Production
- 02 Storage, Transport, and Handling
- 04 Economic, Industrial, and Business Aspects
- 05 Health and Safety
- 07 Products and By-Products
- 08 Properties and Composition
- 09 Environmental Aspects
- 10 Waste Management
- 20 Legislation and Regulations
- 30 Combustion

09 BIOMASS FUELS
- 07 Resources
- 08 Production
- 09 Processing
- 10 Properties and Composition
- 20 Combustion
- 30 Economic, Industrial, and Business Aspects
- 40 Transport, Handling, and Storage
- 50 Environmental Aspects
- 60 Health and Safety
- 70 Legislation and Regulations
- 80 Waste Management
- 90 Products and By-Products

*The numerical subject category scheme is used in the storage, retrieval, and manipulation of bibliographic information entered into DOE's data systems. Categories and definitions for the complete set of six-digit numbers are given in ETDE/PUB--1-R2, *International Energy: Subject Categories and Scope*.

10 SYNTHETIC FUELS
- 02 Production
- 03 Properties and Composition
- 04 Combustion
- 05 Transport, Handling, and Storage
- 06 Health and Safety
- 07 Economic, Industrial, and Business Aspects
- 08 Waste Management
- 09 Environmental Aspects
- 10 Legislation and Regulations
- 20 Products and By-Products

13 HYDRO ENERGY
- 01 Resources and Availability
- 02 Site Geology and Meteorology
- 03 Plant Design and Operation
- 04 Legislation and Regulations
- 05 Economic, Industrial, and Business Aspects
- 06 Environmental Aspects
- 07 Power-Conversion Systems
- 08 Health and Safety

14 SOLAR ENERGY
- 01 Resources and Availability
- 03 Economic, Industrial, and Business Aspects
- 04 Environmental Aspects
- 05 Solar Energy Conversion
- 06 Photovoltaic Power Systems
- 07 Solar Thermal Power Systems
- 08 Ocean Energy Systems
- 09 Solar Thermal Utilization
- 10 Solar Collectors and Concentrators
- 20 Heat Storage
- 30 Health and Safety
- 40 Legislation and Regulations

15 GEOTHERMAL ENERGY
- 01 Resources and Availability
- 02 Geology and Hydrology of Geothermal Systems
- 03 Geothermal Exploration and Exploration Technology
- 04 Legislation and Regulations
- 05 Economic, Industrial, and Business Aspects
- 06 Environmental Aspects
- 07 Products and By-Products
- 08 Geothermal Power Plants
- 09 Geothermal Engineering
- 10 Direct Energy Utilization
- 20 Geothermal Data and Theory
- 30 Health and Safety
- 40 Waste Management

16 TIDAL AND WAVE POWER
- 01 Resources and Availability
- 03 Legislation and Regulations
- 04 Economic, Industrial, and Business Aspects
- 05 Environmental Aspects
- 07 Tidal Power Plants
- 08 Wave Energy Converters
- 09 Health and Safety

17 WIND ENERGY
- 01 Resources and Availability (Climatology)
- 03 Legislation and Regulations
- 04 Economic, Industrial, and Business Aspects
- 05 Environmental Aspects
- 06 Wind Energy Engineering
- 07 Health and Safety

20 FOSSIL-FUELED POWER PLANTS
- 01 Power Plants and Power Generation
- 02 Waste Management
- 04 Health and Safety
- 05 Environmental Aspects
- 06 Economic, Industrial, and Business Aspects
- 07 Legislation and Regulations

21 NUCLEAR POWER REACTORS AND ASSOCIATED PLANTS
- 01 Power Reactors, Nonbreeding, Light-Water Moderated, Boiling Water Cooled
- 02 Power Reactors, Nonbreeding, Light-Water Moderated, Nonboiling Water Cooled
- 03 Power Reactors, Nonbreeding, Graphite Moderated
- 04 Power Reactors, Nonbreeding, Otherwise Moderated or Unmoderated
- 05 Power Reactors, Breeding
- 06 Power Reactors, Mobile, Propulsion, Package, and Transportable
- 07 Regulation and Licensing
- 08 Economics
- 09 Process Heat Reactors

22 NUCLEAR REACTOR TECHNOLOGY
- 01 Theory and Calculation
- 02 Components and Accessories
- 03 Fuel Elements
- 04 Control Systems
- 05 Environmental Aspects
- 06 Research, Test, Training, Production, Irradiation, Materials Testing Reactors
- 09 Reactor Safety

24 POWER TRANSMISSION AND DISTRIBUTION
- 01 Power Systems
- 02 Power System Networks, Transmission and Distribution
- 03 Power Transmission Lines and Cables
- 04 Health and Safety
- 05 Environmental Aspects
- 06 Legislation and Regulations
- 04 Economic, Industrial, and Business Aspects

25 ENERGY STORAGE
- 01 Magnetic
- 02 Compressed and Liquefied Gas
- 04 Capacitor Banks
- 05 Flywheels
- 06 Thermal
- 08 Chemical
- 09 Batteries
- 10 Economic, Industrial, and Business Aspects
- 20 Health and Safety
- 30 Environmental Aspects
- 40 Legislation and Regulations

29 ENERGY PLANNING AND POLICY
- 01 Energy Analysis and Modeling
- 02 Economics and Sociology
- 03 Environment, Health, and Safety
- 04 Energy Resources
- 05 Research, Development, Demonstration, and Commercialization
- 06 Nuclear Energy
- 07 Transport and Storage

08 Heat Utilization
10 Conservation
20 Supply, Demand, and Forecasting
30 Policy, Legislation, and Regulation
40 Fossil Fuels
50 Hydrogen and Synthetic Fuels
60 Electric Power
80 Consumption and Utilization
90 Unconventional Sources and Power Generation

30 DIRECT ENERGY CONVERSION
01 MHD Generators
02 EHD Generators
03 Thermoelectric Generators
04 Thermionic Converters
05 Fuel Cells
08 Miscellaneous Converters

32 ENERGY CONSERVATION, CONSUMPTION, AND UTILIZATION
01 Buildings
02 Transportation
03 Industrial and Agricultural Processes
06 Municipalities and Community Systems
09 Education and Public Relations

33 ADVANCED PROPULSION SYSTEMS
01 Internal Combustion Engines
02 External Combustion Engines
03 Electric-Powered Systems
04 Hybrid Systems
05 Flywheel Propulsion
06 Vehicle Design Factors
07 Emission Control
08 Alternative Fuels

35 ARMS CONTROL
01 Policy, Negotiations, and Legislation
02 Proliferation
03 Verification

36 MATERIALS
01 Metals and Alloys
02 Ceramics, Cermets, and Refractories
06 Other Materials

40 CHEMISTRY
01 Analytical and Separations Chemistry
02 Inorganic, Organic, and Physical Chemistry
04 Electrochemistry
05 Photochemistry
06 Radiation Chemistry
07 Radiochemistry and Nuclear Chemistry
08 Combustion, Pyrolysis, and High-Temperature Chemistry

42 ENGINEERING
02 Facilities, Equipment, and Techniques
04 Heat Transfer and Fluid Flow
05 Materials Testing
10 Combustion Systems
20 Mining and Underground Engineering
30 Marine Engineering
50 Power Cycles
60 Components, Electron Devices and Circuits
70 Nuclear Explosions

43 PARTICLE ACCELERATORS
01 Design, Development, and Operation
02 Beam Dynamics, Field Calculations, and Ion Optics
03 Auxiliaries and Components
04 Storage Rings

44 INSTRUMENTATION
01 Radiation Instrumentation
02 Radiation Effects on Instrument Components, Instruments, or Electronic Systems
04 Well Logging Instrumentation
05 Thermal Instrumentation
06 Optical Instrumentation
07 Geophysical and Meteorological Instrumentation
08 Miscellaneous Instrumentation

45 MILITARY TECHNOLOGY, WEAPONRY, AND NATIONAL DEFENSE
01 Chemical Explosions and Explosives
02 Nuclear Explosions and Explosives
03 Nuclear Explosion Detection
04 Nuclear and Radiological Warfare
05 Strategic Defense Initiative
06 Chemical and Biological

54 ENVIRONMENTAL SCIENCES
01 Environmental Sciences, Atmospheric
02 Environmental Sciences, Terrestrial
03 Environmental Sciences, Aquatic

55 BIOMEDICAL SCIENCES, BASIC STUDIES
01 Behavioral Biology
02 Biochemistry
03 Cytology
04 Genetics
05 Metabolism
06 Medicine
07 Microbiology
08 Morphology
09 Pathology
10 Physiological Systems
20 Public Health
30 Agriculture and Food Technology

56 BIOMEDICAL SCIENCES, APPLIED STUDIES
01 Radiation Effects
02 Thermal Effects
03 Chemicals Metabolism and Toxicology
04 Other Environmental Pollutant Effects

57 HEALTH AND SAFETY
01 Real Accidents

58 GEOSCIENCES

66 PHYSICS
10 General Physics
11 Classical and Quantum Mechanics
12 Techniques of General Use in Physics
12-10 Cryogenics
12-20 Particle Beam Production and Handling; Targets
13 Other Aspects of Physical Science
20 Physics of Elementary Particles and Fields
21 General Theory of Particles and Fields
22 Specific Theories and Interaction Models; Particle Systematics
23 Specific Interactions, Decays and Processes

24 Properties of Specific Particles and Resonances
30 Nuclear Physics
31 Nuclear Structure
32 Radioactivity and Electromagnetic Transitions (Excluding Fission)
33 Nuclear Reactions and Scattering, General
34 Specific Nuclear Reactions and Scattering
35 Nuclear Mass Ranges
36 Radiation Physics
40 Atomic and Molecular Physics
41 Theory of Electronic Structure of Atoms and Molecules
42 Spectra of Atoms and Molecules and Their Interactions with Photons
43 Collision Phenomena
44 Experimentally Derived Information on Atomic and Molecular Properties
45 Special Atoms and Molecules
50 Physics of Condensed Matter
51 Nuclear Techniques in Condensed Matter Physics
52 Solid-State Plasma
53 Interactions Between Beams and Condensed Matter
54 Quantum Physics Aspects of Condensed Matter
54-10 Superconductivity
54-20 Superfluidity
54-30 Other Topics in Quantum Fluids and Solids
55 Direct Energy Conversion

70 PLASMA PHYSICS AND FUSION
03 Plasma Physics and Fusion Research
04 Fusion Technology

99 GENERAL AND MISCELLANEOUS
01 Management
02 Mathematics and Computers
03 Information Handling
04 Law

CORPORATE AUTHOR INDEX

PERSONAL AUTHOR INDEX

SUBJECT INDEX

CONTRACT NUMBER INDEX

REPORT NUMBER INDEX

ORDER NUMBER CORRELATION

Alphabetical Listing of Categories

33 ADVANCED PROPULSION SYSTEMS
35 ARMS CONTROL
09 BIOMASS FUELS
56 BIOMEDICAL SCIENCES, APPLIED STUDIES
55 BIOMEDICAL SCIENCES, BASIC STUDIES
40 CHEMISTRY
01 COAL, LIGNITE, AND PEAT
30 DIRECT ENERGY CONVERSION
32 ENERGY CONSERVATION, CONSUMPTION, AND UTILIZATION
29 ENERGY PLANNING AND POLICY
25 ENERGY STORAGE
42 ENGINEERING
54 ENVIRONMENTAL SCIENCES
20 FOSSIL-FUELED POWER PLANTS
99 GENERAL AND MISCELLANEOUS
58 GEOSCIENCES
15 GEOTHERMAL ENERGY
57 HEALTH AND SAFETY
13 HYDRO ENERGY
08 HYDROGEN
44 INSTRUMENTATION
07 ISOTOPE AND RADIATION SOURCE TECHNOLOGY
36 MATERIALS
45 MILITARY TECHNOLOGY, WEAPONRY, AND NATIONAL DEFENSE
03 NATURAL GAS
05 NUCLEAR FUELS
21 NUCLEAR POWER REACTORS AND ASSOCIATED PLANTS
22 NUCLEAR POWER TECHNOLOGY
04 OIL SHALES AND TAR SANDS
43 PARTICLE ACCELERATORS
02 PETROLEUM
66 PHYSICS
70 PLASMA PHYSICS AND FUSION
24 POWER TRANSMISSION AND DISTRIBUTION
14 SOLAR ENERGY
10 SYNTHETIC FUELS
16 TIDAL AND WAVE POWER
17 WIND ENERGY

Energy Research Abstracts

01 COAL, LIGNITE, AND PEAT

0103 Preparation

Refer also to citation(s) 7135, 7144, 7146

7087 (DOE/PC/90308–T2) **A new model of coal-water interaction and relevance for dewatering. Final report.** Suuberg, E.M.; Yun, Y.; Lilly, W.D.; Leung, K.; Gates, T.; Otake, Y.; Deevi, S.C. Brown Univ., Providence, RI (United States). Div. of Engineering. [1995]. 150p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-90PC90308. Order Number DE95005767. Source: OSTI; NTIS; GPO Dep.

This project was concerned with developing an improved understanding of how moisture is held in coals. There is a concern that the historically held view, that capillary condensation in pores plays a significant role, could not be correct, since the coal shrinks and swells in response to moisture loss and gain. Thus there is no well-defined pore system for holding the moisture. This appears true for a range of ranks from lignite to high volatile bituminous coal. Instead, it appears that something more like classical swelling of coals in solvents is responsible. This study examined this hypothesis by various means, considering both the mixing thermodynamics of coal and water (or coal and other swelling solvents) and by examining coal's elastic response. The conclusion is that water does indeed behave like many other swelling solvents, but is a somewhat poor swelling solvent. The structure of the water swollen coal appears to remain fairly glassy, implying that many non-covalent crosslinks remain unbroken. The water interacts with coal only at certain types of adsorption sites. This is consistent with a second historical view that polar functionality is responsible for water retention. The filling of these sites, somewhat surprisingly, appeared to involve a strong enthalpic driving force, rather than the entropic driving force that characterizes solvent swelling in other solvents. The practical importance of these results for thermal dewatering processes is that the historical view is supported. That is, that pyrolytic polar group removal is necessary. An alternative suggestion, based upon attempts to further crosslink coal, has not received support.

7088 (DOE/PC/90314–T1) **Hydrocarbon-oil encapsulated air bubble flotation of fine coal. 1st Quarterly report, October 1, 1990–December 31, 1990.** Peng, F.F. West Virginia Univ., Morgantown, WV (United States). [1995]. 26p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-90PC90314. Order Number DE95005503. Source: OSTI; NTIS; GPO Dep.

In the froth flotation process, whether accomplished In a conventional stirred tank flotation cell, in a column flotation cell, in an air sparged cyclone flotation or in a static-tube cell by using microbubbles, it requires the addition of large quantity of surfactants such as frother and/or collector (or promoter). In coarse coal flotation, special reagents are used such as high molecular weight frothers, the collector with a non-ionic, low foam emulsifier, Sherex Shur Coal 159 or Sherex Shur Coal 168 blended with fuel oil No. 2. These reagents in liquid forms are directly added into the coal pulp in the flotation cell. Frequently, a conditioning tank is required to achieve the dispersion of the reagents. The dispersion of the collector such as hydrocarbon-oil (insoluble or partially soluble) by a mechanical mixer in the coal pulp is often inadequate. In this work, in order to demonstrate the effectiveness of collector droplet size and dispersion on froth flotation processes, a unique gasified collector dispersion and oil-coated bubble generation system was used. The hydrocarbon oil collector was gasified at a temperature approximately 40 degrees C above the fractionation temperature of the collector to avoid pyrolysis. Gasified collector is first mixed in the air stream and transported to the air diffusion hood in the flotation cell. The oil-coated air bubbles were then generated and diffused into solid-water phases.

7089 (DOE/PC/90314–T2) **Hydrocarbon-oil encapsulated bubble flotation of fine coal. Technical progress report for the sixth quarter, January 1, 1992–March 30, 1992.** Peng, F.F.; Cho, E.H. West Virginia Univ., Morgantown, WV (United States). [1995]. 27p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-90PC90314. Order Number DE95005504. Source: OSTI; NTIS; GPO Dep.

Collector dispersion plays an important role in fine coal flotation because the hydrophobicity and thus flotation rate/selectivity may be increased by dispersing the collector. In this study, four modes of collector dispersion techniques were tested. They were mechanical agitation, ultrasonic energy dispersed collector addition, atomized collector addition, and gasified collector addition. These methods were tested on the flotation of four different ranks of the coal samples of -600μm size (-30 mesh US sieve, or -28 mesh Tyler sieve). In addition to flotation experiments, induction time of bubble attachment to the bed of fine coal particles was measured. The ultrasonic energy dispersed and atomized collector addition techniques enhanced flotation yield and most significantly improved the kinetics of fine coal flotation. The gasified collector flotation method could increase the selectivity of separation and decrease the collector consumption. The combustible recovery by the gasified collector flotation was lower than that by the conventional method but the selectivity by the former method was higher than that by the latter method. Application of the four different collector dispersion methods enhanced the hydrophobic character of all the four ranks of the coal samples as was evidenced by the induction time measurement as well as the flotation responses.

7090 (DOE/PC/90314–T3) **Hydrocarbon-oil encapsulate bubble flotation of fine coal. Technical progress report for the seventh quarter, April 1, 1992–June 30, 1992.** Peng, F.F. West Virginia Univ., Morgantown, WV (United States). [1995]. 27p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-90PC90314. Order Number DE95005505. Source: OSTI; NTIS; GPO Dep.

This reporting period has been devoted in the study of lyophobic characteristics of six ranks of coals which were selected for the study of hydrocarbon-oil encapsulated bubble flotation of fine coals. Additionally, the coal particle surfaces treated with collector using various collector dispersion techniques are also tested in the film flotation. The experimental techniques and instruments used for the measurement of hydrophobicity and floatability of fine coals include (1) Film flotation, (2) Induction timer, (3) Hallimond cell and (4) stirred tank flotation cell are given. The static float and sink test known as the film flotation process were used to characterize the wetting behaviors of the fine coal surfaces. In this flotation technique, the coal particles were tested on the interface of a series of aqueous methanol solution of different surface tensions. The distributions of lyophobic particles as the function of the wetting surface tensions of the particles were obtained. From the frequency distribution of critical surface tensions, the parameters such as the mean critical surface tension, dispersion and average contact angle for the coal particle surfaces were calculated. These parameters characterized the heterogeneity of the coal particle surfaces and correlated well with the induction time, floatability and flotation response data obtained from Hallimond cell and a stirred tank cell. Furthermore, the frequency distributions of hydrophobic surface sites of the particle surfaces were also derived from the results of film flotation tests. These frequency distributions were extended to interpret and predict the flotation rates and recoveries for the coal samples without treating and coal samples treated with collector using various collector dispersion techniques.

7091 (DOE/PC/90314–T4) **Hydrocarbon-oil encapsulate bubble flotation of fine coal. Technical progress report for the eighth quarter, July 1, 1992–September 30, 1992.** Peng, F.F. West Virginia Univ., Morgantown, WV (United States). [1995]. 20p. Sponsored by USDOE, Washington, DC (United States). DOE

Contract FG22-90PC90314. Order Number DE95005506. Source: OSTI; NTIS; GPO Dep.

A portion of this reporting period has been consumed in the following tasks: (1) development of air-water-frother sparging system using an assemble of two sets of atomizers; (2) conducting the column flotation tests followed $2^6 \times 1/4$ fractional factorial design; (3) to develop a collector gasifier system for formation of hydrocarbon-oil encapsulated bubbles. To effectively remove sulfur and mineral matters from coal, the coal particles must be ground to minus 75 μm (minus 200 U.S. sieve) or less to liberate the pyrite and mineral matters from the coal matrix. As reported in a previous report (Fifth Quarterly report), in order to effectively reduce ash content in fine clean coal products using a 3-in. flotation column, the height of the column must be increased to increase the depth of the frother and the residence time of coal particles in the flotation column. In this study, a series of column flotation tests were conducted on freshly ground minus 75 μm Upper Freeport seam coal. The flotation column is equipped with froth washing device as well as two sets of atomizers for sparging the air-water and frother mixture. The operation of column flotation involves the multiplicity of control variables. Thus, three phases of work plan were used to minimize the number of tests. In this report, the results of column flotation tests obtained in the third phase of the experiment work are reported. The column flotation is capable of achieving 90 percent or more of combustible recovery and 70 percent or more of ash rejection from the raw coal contained 20 percent or greater ash content. The main objectives of this reporting period are: (1) to establish a test procedure, and to determine the optimal height of flotation column and operating conditions for cleaning minus 75 μm Upper Freeport seam coal, and (2) to extend the test procedure and the operating conditions established to clean various seam coals using a hydrocarbon-oil encapsulated bubble flotation.

7092 (DOE/PC/90314–T5) **Hydrocarbon-oil encapsulated bubble flotation of fine coal. Technical progress report for the ninth quarter, October 1, 1992–December 31, 1992.** Peng, F.F. West Virginia Univ., Morgantown, WV (United States). Dept. of Mineral Processing Engineering. [1995]. 26p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-90PC90314. Order Number DE95005507. Source: OSTI; NTIS; GPO Dep.

A main portion of this reporting period has been consumed in the following tasks to establish the base line for hydrocarbon oil encapsulated bubble flotation: (1) to measure the residence time distribution and formulate the axial dispersion model of 1-in. I.D. flotation column, (2) to obtain the optimum operating conditions using three phase experiment design approach followed the fractional factorial design, (3) to develop the column scale-up procedure and formulate recovery predicting model for flotation column, (4) to apply the models developed to design a 3-in. ID flotation column and predicting the cleaning results, (5) to test the collector gasification system installed on the 3-in. I.D. flotation column for hydrocarbon-oil capsulated bubble flotation of fine coal. Column flotation of minus 47 μm (-400 US sieve) Pittsburgh No. 8 seam coal was carried out to study the column scale-up procedure using one-inch column. The dispersion model of nonideal flow was applied to describe the hydrodynamic state within the column. This model may be used to predict the collection zone recovery of column flotation in scale-up procedure if the column flotation is a first-order rate process. Residence Time Distribution (RTD) data of the column flotation were measured to determine the parameters of the model. It was found that an empirical distribution, logarithmic normal distribution can describe the RTD curve well. The effects of operating variables and column geometry on the Peclet number, Pe, which measure the extent of axial dispersion were studied and an empirical expression of Pe was obtained. Using the dispersion model, the column flotation of fine coal recovery can be predicted.

7093 (DOE/PC/90314–T6) **Hydrocarbon-oil encapsulated air bubble flotation of fine coal. Technical progress report for the second quarter, January 1, 1991–March 31, 1991.** Peng, F.F. West Virginia Univ., Morgantown, WV (United States). [1995]. 23p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-90PC90314. Order Number DE95005508. Source: OSTI; NTIS; GPO Dep.

The objective of the present work is to have a good understanding on the fundamentals of modes of reagent/collector dispersion and adsorbing collector on the bubbles to improve the selectivity and recovery of fine coal flotation. A portion of this reporting period has been consumed in building experimental apparatus and equipment. These include an automated flotation machine, a computer-based induction time apparatus, a bubble charge measuring apparatus, continuous flotation column, etc. An automated flotation machine was constructed for Denver model D-12 with 2- and 4-liter cells. The standard test procedure was established for using the machine with improved pulp level control and constant frother removal to minimize the human error. The flotation results of Upper Freeport coal sample showed a good reproducibility for using the improved automatic flotation machine/cell. The reagentless flotation was conducted in a Hallimond tube to determine the hydrophobicity of coal particles. Upper Freeport coal samples were used for all of the tests including -30 mesh, -200 mesh and -400 mesh U.S. sieves coal samples. High floatability was obtained for Upper Freeport coal samples. The significant entrainment of fine particles were observed for coal samples with -200 mesh and -400 mesh U.S. Sieve samples. The electrokinetic properties of coal particles from Upper Freeport seam was determined as the function of pH, frother or collector concentrations. The IEP of -200 mesh coal particle was at pHaw.53. The zeta potential of the coal particles with or without addition of MIBC or kerosene were exhibited negative values for pH greater than 3 and decreased with increasing pH values. The coal particles with kerosene has the higher zeta-potential value than that of particles with MIBC or free of frother/collector. The negative zeta-potential of coal sample was also observed regardless of MIBC concentration employed.

7094 (DOE/PC/90314–T7) **Hydrocarbon-oil encapsulated air bubble flotation of fine coal. Technical progress report for the third quarter, April 1, 1991–June 30, 1991.** Peng, F.F. West Virginia Univ., Morgantown, WV (United States). Dept. of Mineral Processing Engineering. [1995]. 37p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-90PC90314. Order Number DE95005509. Source: OSTI; NTIS; GPO Dep.

This report is concerned with the progress made during the third period of the two year project. A significant portion of this reporting period has been consumed in measurement of induction time of oil-free and oil-coated bubbles, modification of collector gasifier, hydrocarbon oil encapsulated flotation tests and float and sink analyses of various rank of coal samples, building a 1-inch column cell, as well as building the ultrasound collector emulsification apparatus. Induction time has been measured using an Electronic Induction Timer. The results indicate that alteration of chemical properties of air bubble by applying hydrocarbon oil or reagent can drastically improve the rate of flotation process. Various techniques have been employed in hydrocarbon oil encapsulated flotation processes to further enhance the selectivity of the process, which include: (1) gasified collector flotation with addition of gasified collector into the air stream in the initial stage; (2) two-stage (rougher-cleaner) gasified collector flotation; and (3) starvation gasified collector flotation by addition of gasified collector at various flotation times. Among these, three techniques used in hydrocarbon oil encapsulated flotation process, the starvation flotation technique provides the best selectivity.

7095 (DOE/PC/90314–T8) **Hydrocarbon-oil encapsulated bubble flotation of fine coal. Technical progress report for the fourth quarter, July 1, 1991–September 30, 1991.** Peng, F.F. West Virginia Univ., Morgantown, WV (United States). [1995]. 32p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-90PC90314. Order Number DE95005510. Source: OSTI; NTIS; GPO Dep.

This report is concerned with the progress made during the fourth period of the research Project, Grant no. DE-FG22-90-PC90314. A main portion of this reporting period has been consumed in the following tasks: (i) induction time measurement for the coal particles prepared by using various modes of collector addition techniques; (ii) ultrasonic energy dispersed collector flotation tests; (iii) natural floatability measurement using Hallimond tube flotation cell; (iv) preparation and operation of 3-inch column

cell, and (v) preparation of wettability measurement using film flotation method. The coal samples used in this period of work are four ranks of coal samples from Mammoth (Anthracite), Lower Kittanning, Upper Freeport and Pittsburgh No. 8 seam coals. The results showed that a drastic improvement in the flotation rate and yield were achieved by using the ultrasonic energy dispersed collector flotation compared to that of conventional flotation. The techniques of direct liquid addition and addition of ultrasonic energy dispersed collector are mainly for alteration of the hydrophobicity distribution of coal particle surfaces. On the contrary, the gasified collector addition to the gas phase technique is for alteration of the chemical properties of bubble surfaces. Among these techniques, however, the results showed that the hydrocarbon oil encapsulated bubble flotation is more selective than either ultrasonic energy dispersed collector flotation process or conventional flotation process. Induction time measurement was continued and extended to the coal samples received in this period of work, using oil free air bubble and oil-coated air bubbles. Induction time for oil-coated bubbles is significantly shorter than that of oil-free bubbles for all the coal samples used. A good agreement between flotation responses and induction time were obtained for all the coal samples under the conditions of various modes of collector dispersion.

7096 (DOE/PC/92206–T7) **Bench-scale testing of the micronized magnetite process. Quarterly technical progress report No. 1, July–September 1994.** AMAX R and D, Inc., Pittsburgh, PA (United States). [1994]. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-93PC92206. Order Number DE95005769. Source: OSTI; NTIS; GPO Dep.

The primary project objectives are: test the feasibility (ie., magnetite losses) of a fully-integrated, conventional wet-drum separator circuit for magnetite recovery. If losses are too high (greater than 10 #/ton), we will try HGMS.; determine the impact of changing recirculating media quality on heavymedia cyclone performance. If losses are low (less than 5#/ton), the magnetite changes will be insignificant. The only changes will then be degree of fine-coal contamination of the media. The testing will be done with 2 to 3 grades of micronized magnetite (differing sizes and perhaps qualities), and 2 to 3 different bituminous coals (Pittsburgh and a softer coal). The secondary objectives, in which Custom Coals is also interested, include: Test the application of drain and rinse screens down to finer sizes than previously tested (200 to 325 mesh); determine the feasibility of using single circuitry to feed a wider size range (28 x 325 mesh). During July 1994, Custom Coals, Int. and AMAX R&D signed the novation agreement switching the prime contract for the Micronized Magnetite Project to Custom Coals. However, no project work was performed during July and August, 1994. The major focus of the work performed in September was: Finalizing the Equipment List for major purchases; finalizing the Circuit Flowsheet and P&ID. This report summarizes the results from those efforts, and introduces the new project objectives, schedule, an budget. The final section contains the major priorities for the next quarter (October through December, 1994).

7097 (DOE/PC/92246–T7) **Development of enhanced sulfur rejection processes. Final technical progress report, July 1–September 30, 1993.** Yoon, R.H.; Luttrell, G.; Adel, G.; Richardson, P.E. Virginia Center for Coal and Minerals Processing, Blacksburg, VA (United States). 12 Nov 1993. 54p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-92PC92246. Order Number DE95005551. Source: OSTI; NTIS; GPO Dep.

Research at Virginia Tech led to the development of two complementary concepts for improving the removal of inorganic sulfur from many eastern US coals. These concepts are referred to as Electrochemically Enhanced Sulfur Rejection (EESR) and Polymer Enhanced Sulfur Rejection (PESR). The EESR process uses electrochemical techniques to suppress the formation of hydrophobic oxidation products believed to be responsible for the floatability of coal pyrite. The PESR process uses polymeric reagents that react with pyrite and convert floatable middlings, i.e., composite particles composed of pyrite with coal inclusions, into hydrophilic particles. These new pyritic-sulfur rejection processes do not require significant modifications to existing coal preparation facilities, thereby enhancing their adoptability by the coal industry. It is believed that these processes can be used simultaneously to maximize the rejection of both well-liberated pyrite and composite coal-pyrite particles. The technical research was initiated on October 1, 1992, and a detailed work plan and work schedule (Task 1) were developed. During this reporting period, research was conducted to evaluate the liberation characteristics of various pyrite samples (Task 2), to further characterize the oxidation behavior of pyrite using electrochemical and X-ray photoelectron spectroscopy and evaluate the use of sacrificial anode materials as a practical method of depressing pyrite (Task 5), and investigate the use of polymers containing a variety of functional groups to depress pyrite (Task 6).

7098 (DOE/PC/92521–T193) **Removal of pyrite and trace elements from waste coal by dissolved-CO_2 flotation and chelating agents. Final technical report, September 1, 1993–August 31, 1994.** Shiao, S.Y. (Babcock and Wilcox Co., New Orleans, LA (United States)); Ho, K. Illinois Dept. of Energy and Natural Resources, Springfield, IL (United States). [1994]. 36p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FC22-92PC92521. Order Number DE95005564. Source: OSTI; NTIS; GPO Dep.

The overall objective of this project was to use ultrafine bubbles generated by dissolved $C0_2$ to recover useable fuel, and reject pyrite and other minerals from a waste coal in flotation. In addition, a chelating agent was used to remove trace metals from the froth products. Illinois No. 6 waste coal obtained from a refuse thickener of a coal cleaning circuit was used as the feed in flotation. The as-received waste coal had a top size of 2400 microns. The waste coal was ground to −75 microns (−200 mesh) and −44 microns (−325 mesh). The as-received and the ground waste coal samples were subjected to flotation. Dissolved-CO_2 flotation tests were performed mainly in a 3-inch diameter by 8 feet high packed column under various test conditions. Some tests were also performed in a 2-inch diameter microbubble column for comparison. The flotation performance of the waste coal in the microbubble column was higher than that for the packed column. The packing in the packed column hindered the coal flotation. The separation efficiency of the ground coal was less than that for the asreceived coal. Flotation of the waste coal was also performed in the packed column using coarser bubbles generated by dispersed $C0_2$ and air. The separation efficiency of the ground waste coal of 44 microns top size was higher than that for dissolved-CO_2 flotation. Additives were used to modify the waste coal surfaces. Triton-X 100, a nonionic surfactant and EDTA, a chelating agent, increased the separation efficiency of the waste coal.Most of the trace metals in coal were reduced in different degrees by flotation. Triton X-100 or EDTA enhanced removal of chromium, nickel, and selenium. Applying EDTA to the froth products further removed lead significantly.

7099 (DOE/PC/93203–T4) **Electrostatic beneficiation of coal. Quarterly technical progress report, July 1, 1994–September 30, 1994.** Mazumder, M.K.; Lindquist, D.; Tennal, K.B. Arkansas Univ., Little Rock, AR (United States). Nov 1994. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-93PC93203. Order Number DE95006244. Source: OSTI; NTIS; GPO Dep.

Experiments were continued to measure average charge for the negative fraction, for the positive fraction and for the non-separated fraction. Freshly ground Illinois No. 6 coal was used. Construction of the parallel plate separator was continued. Results on triboelectric separation of coal powder are reported. Charge-to-mass ratios were measured for coal using the E-SPART Analyzer. Development continued on an optical image analysis method. Preliminary data were obtained on the surface content and surface area of the coal powders.

7100 (DOE/PC/94116–T1) **Emissions reductions in coal-fired home heating stoves through use of briquettes. Quarterly report, April 1, 1994–June 30, 1994.** Jozewicz, W. Acurex Corp., Research Triangle Park, NC (United States). 28 Jul 1994. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FC22-94PC94116. Order Number DE95005554. Source: OSTI; NTIS; GPO Dep.

The objective of the work is to create a commercially successful venture to market a low-emission coal briquette to the residential heating market in Krakow. Drilling Phase I, small quantities of the

briquetted product will be manufactured and tested. Five Polish coals and two Polish sources of binder material will be tested to determine their amenability to forming briquettes. Small-scale combustion tests will also be performed during Phase I to determine the effectiveness of the briquettes in reducing emissions. A preliminary engineering review for the Phase II briquetting plant will also be performed. Construction of a new plant in Katowice to serve the Krakow market is being considered. This quarter has been a period of startup for this project. Contractual requirements have been completed with several partners. One proposed partner has withdrawn; a replacement organization has been identified. An assistant project manager has been hired and deployed to Krakow. Several deliverables have been completed including the Draft Project Management Plan, Foreign Travel Report, Hazardous Substance Plan, and the Test Plan for Akademia Gorniczo Hutnicza (AGH). Official appraisals for Przedsiebiorstwo Energetyki Cieplnej (PEC) and INCO Veritas have also been delivered. Initial briquetting experiments have been completed. Several presentations were made and two papers were submitted for conferences that will be held in the next quarter.

7101 (DOE/PC/94116–T2) **Emissions reductions in coal-fired home heating stoves through use of briquettes. Quarterly report, July 1, 1994–September 30, 1994.** Acurex Environmental Corp., Research Triangle Park, NC (United States). 28 Oct 1994. 31p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FC22-94PC94116. Order Number DE95005763. Source: OSTI; NTIS; GPO Dep.

This quarter has seen additional experimentation in the briquette formulation. Several combustion tests have been performed. Many of the results are presented here, though the organics analysis is still in progress. Several deliverables have been completed. These include the revised proposal requested by the US Department of Energy (DOE) and a revised Project Management Plan. Two presentations were made, and a paper was submitted for a conference to be held next quarter. Facility modifications have been proceeding at Euromining Consulting's Brikpol facility at Bogdanka. Business development, however, is on hold while Acurex Environmental awaits DOE's approval of the revised proposal and a revised contract.

0104 Processing

Refer also to citation(s) 7097, 7149, 7152, 7231, 7247, 7547, 7563, 7564, 7567, 7628, 7629, 7630, 7931

7102 (DOE/MC/26366–3962) **A calcium oxide sorbent process for bulk separation of carbon dioxide.** Harrison, D.P. Louisiana State Univ., Baton Rouge, LA (United States). Dept. of Chemical Engineering. Oct 1994. 23p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC21-89MC26366. Order Number DE95006089. Source: OSTI; NTIS; GPO Dep.

Feasibility is being studied for a high-temperature, high-pressure process for bulk separation of CO_2 from coal-derived gas. In Phase I, an electrobalance reactor was used toestablish the technical feasibility of the regenerable sorbent process. Phase II involved scaleup from microgram to gram quantities sof sorbent and a switch from the electrobalance reactor to a fixed-bed reactor with capability for feed and product gas analysis.

7103 (DOE/MC/27391–3943) **Scale-up of mild gasification to a process development unit. Quarterly report, February 1994–May 1994.** Doane, E.P.; Carty, R.H.; Foster, H. Kerr-McGee Coal Corp., Oklahoma City, OK (United States). Nov 1994. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FC21-92MC27391. Order Number DE95000038. Source: OSTI; NTIS; GPO Dep.

The overall objective of this project is to develop the IGT Mild-Gasification (MILDGAS) process for near-term commercialization. The specific objectives of the program are to: (1) design, construct, and operate a 24-tons/day adiabatic process development unit (PDU) to obtain process performance data suitable for further design scaleup; (2) obtain large batches of coal-derived co-products for industrial evaluation; (3) prepare a detailed design of a demonstration unit; (4) develop technical and economic plans for commercialization of the NMDGAS process. The project team that is performing the initial phases of the PDU development are: Kerr-McGee Coal Corporation (K-M Coal), the Institute of Gas Technology (IGT), Bechtel Corporation (Bechtel), and Southern Illinois University at Carbondale (SIUC). The MILDGAS process is a continuous closed system for producing liquid and solid (char) co-products at mild operating conditions up to 50 psig and 1300°F. It is capable of processing a wide range of both eastern caking and western noncaking coals. The 1 ton/hr PDU facility that is to be constructed is comprised of a 2.5-ft ID adiabatic gasifier for the production of gases, coal liquids, and char; a three-stage condensation train to condense and store the liquid products; and coal feeding and char handling equipment. The facility will also incorporate support equipment for environmentally acceptable disposal of process waste. This quarter, the bids from Bateman Engineering and Kilborn Engineering were analyzed and Kilborn appeared to be the successful bidder. Negotiations with Kilborn Engineering to finalize the exact scope and cost of their bid were undertaken but Kilborn is unwilling to assume the standard flowdown liability clause. Because of this impasse, alternatives to Kilborn are being explored.

7104 (DOE/MC/29246–3941) **Hot coal gas desulfurization with manganese-based sorbents. Final report, September 1992–December 1994.** Hepworth, M.T.; Slimane, R.B. Minnesota Univ., Minneapolis, MN (United States). Nov 1994. 165p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC21-92MC29246. Order Number DE95000034. Source: OSTI; NTIS; GPO Dep.

The focus of much current work being performed by the Morgantown Energy Technology Center (METC) of the Department of Energy on hot coal-derived fuel gas desulfurization is in the use of zinc-based sorbents. METC has shown interest in formulating and testing manganese-based pellets as alternative effective sulfur sorbents in the 700 to 1200°C temperature range. To substantiate the potential superiority of Mn-based pellets, a systematic approach toward the evaluation of the desulfurizing power of single-metal sorbents is developed based on thermodynamic considerations. This novel procedure considered several metal-based sorbents and singled out manganese oxide as a prime candidate sorbent capable of being utilized under a wide temperature range, irrespective of the reducing power (determined by CO_2/CO ratio) of the fuel gas. Then, the thermodynamic feasibility of using Mn-based pellets for the removal of H_2S from hot-coal derived fuel gases, and the subsequent oxidative regeneration of loaded (sulfided) pellets was established. It was concluded that MnO is the stable form of manganese for virtually all commercially available coal-derived fuel gases. In addition, the objective of reducing the H_2S concentration below 150 ppMv to satisfy the integrated gasification combined cycle system requirement was shown to be thermodynamically feasible. A novel process is developed for the manufacture of Mn-based spherical pellets which have the desired physical and chemical characteristics required.

7105 (DOE/MC/29246–3944) **Hot coal gas desulfurization with manganese-based sorbents.** Hepworth, M.T.; Ben-Slimane, R. Minnesota Univ., Minneapolis, MN (United States). Dec 1994. 24p. Sponsored by USDOE, Washington, DC (United States);Department of the Interior, Washington, DC (United States). DOE Contract AC21-92MC29246. Grant USDI-BM/C0299002-Mod.3. Order Number DE95000036. Source: OSTI; NTIS; GPO Dep.

The focus of work being performed on Hot Coal Gas Desulfurization at the Morgantown Energy Technology Center is primarily in the use of zinc ferrite and zinc titanate sorbents; however, prior studies indicated that an alternate sorbent, manganese dioxide-containing ore in mixture with alumina (75 wt % ore + 25 wt % Al_2O_3) may be a viable alternative to zinc-based sorbents. Manganese, for example, has a lower vapor pressure in the elemental state than zinc hence it is not as likely to undergo depletion from the sorbent surface upon loading and regeneration cycles. Also manganese oxide is less readily reduced to the elemental state than iron hence the range of reduction potentials for oxygen is somewhat greater than for zinc ferrite. In addition, thermodynamic analysis of the manganese-oxygen-sulfur system shows it to be less amenable to sulfation than zinc ferrite. Potential also exists for

utilization of manganese at higher temperatures than zinc ferrite or zinc titanate. This annual topical report documents progress in pelletizing and testing via thermo-gravimetric analysis of individual pellet formulations of manganese ore/alumina combinations and also manganese carbonate/alumina with two binders, dextrin and bentonite.

7106 (DOE/MC/29444–3984) **Toms Creek Integrated Gasification Combined Cycle Demonstration Project. Quarterly progress report, July 1, 1994–September 30, 1994.** Wahlroos, H. (Enviropower, Inc., Tampere (Finland)); Ghazanfari, R.; Horvath, A.; Mojtahedi, W. TAMCO Power Partners, Williamsport, PA (United States); Enviropower, Inc., Tampere (Finland). [1994]. 24p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FC21-93MC29444. Order Number DE95006221. Source: OSTI; NTIS; GPO Dep.

This Quarterly report for the period ending September 30, 1994, summarizes work done by Tampella Power Corporation. Site specific heat and material balances were prepared for possible alternate sites, plant cost estimates were prepared and reviewed, and the gasification pilot plant in Tampere, Finland, was visited.

7107 (DOE/MC/30012–3980) **Advanced sulfur control concepts in hot-gas desulfurization technology: Phase 1, Feasibility of the direct production of elemental sulfur during the regeneration of high temperature desulfurization sorbents.** Lopez, A.; White, J.; Groves, F.R.; Harrison, D.P. Louisiana State Univ., Baton Rouge, LA (United States). Oct 1994. 54p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC21-94MC30012. Order Number DE95006160. Source: OSTI; NTIS; GPO Dep.

This topical report de-scribes the results of Phase 1 research performed during the first six months of a three-year contract to study the feasibility of the direct production of elemental sulfur during the regeneration of high temperature desulfurization sorbents. Much effort has gone into the development of a high-temperature meal oxide sorbent process for removal of H_2S from the coal gas. A number of sorbents based upon metals such as zinc, iron, manganese and others have been studied. In order for high temperature desulfurization to be economical it is necessary that the sorbents be regenerated to permit multicycle operation. Current methods of sorbent regeneration involve oxidation of the metal sulfide to reform the metal oxide and free the sulfur as SO_2. An alternate regeneration process in which the sulfur is liberated in elemental form is preferable. The overall objective of the current research is to study simpler and economically superior processing of known sorbents capable of producing elemental sulfur during regeneration. This topical report summarizes the first steps of this effort. A literature search has been completed to identify possible regeneration concepts and to collect relevant thermodynamic, kinetic, and process data. Three concepts involving reaction with SO_2, partial oxidation using an $O_2 - H_2O$ mixture, and steam regeneration have been identified. The first two concepts result in the direct production of elemental sulfur while H_2S is the product of steam regeneration. This concept is of potential interest, however, since existing Claus technology can be used to convert H_2S to elemental sulfur. Following the literature search, a thermodynamic analysis, based upon free-energy minimization was carried out to evaluate candidate sorbents for possible use with the three regeneration concepts.

7108 (DOE/METC/C–94/7150) **Pilot gasification and hot gas cleanup operations.** Rockey, J.M.; Galloway, E.; Thomson, T.A.; Rutten, J.; Lui, A. USDOE Morgantown Energy Technology Center, WV (United States). [1995]. 3p. Sponsored by USDOE, Washington, DC (United States). (CONF-9406131–66: Coal-fired power systems: advances in IGCC and PFBC review meeting, Morgantown, WV (United States), 21-23 Jun 1994). Order Number DE95003385. Source: OSTI; NTIS; GPO Dep.

The Morgantown Energy Technology Center (METC) has an integrated gasification hot gas cleanup facility to develop gasification, hot particulate and desulfurization process performance data for IGCC systems. The objective of our program is to develop fluidized-bed process performance data for hot gas desulfurization and to further test promising sorbents from lab-scale screening studies at highpressure (300 psia), and temperatures (1,200°F) using coal-derived fuel gases from a fluid-bed gasifier. The 10-inch inside diameter (ID), nominal 80 lb/hr, air blown gasifier is capable of providing about 300 lb/hr of low BTU gas at 1,000°F and 425 psig to downstream cleanup devices. The system includes several particle removal stages, which provide the capability to tailor the particle loading to the cleanup section. The gas pressure is reduced to approximately 300 psia and filtered by a candle filter vessel containing up to four filter cartridges. For batch-mode desulfurization test operations, the filtered coal gas is fed to a 6-inch ID, fluid-bed reactor that is preloaded with desulfurization sorbent. Over 400 hours of gasifier operation was logged in 1993 including 384 hours of integration with the cleanup rig. System baseline studies without desulfurization sorbent and repeatability checks with zinc ferrite sorbent were conducted before testing with the then most advanced zinc titanate sorbents, ZT-002 and ZR-005. In addition to the desulfurization testing, candle filters were tested for the duration of the 384 hours of integrated operation. One filter was taken out of service after 254 hours of filtering while another was left in service. At the conclusion of testing this year it is expected that 3 candles, one each with 254, 530, and 784 hours of filtering will be available for analysis for effects of the exposure to the coal gas environment.

7109 (DOE/MT/93005–4) **Simultaneous removal of H_2S and NH_3 in coal gasification processes. Quarterly report, July 1, 1994–September 30, 1994.** Jothimurugesan, K.; Adeyiga, A.A.; Gangwal, S.K. Hampton Univ., VA (United States). Dept. of Engineering. [1995]. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-93MT93005. Order Number DE95005382. Source: OSTI; NTIS; GPO Dep.

The objective of this study is to develop advanced high-temperature coal gas desulfurization mixed-metal oxide sorbents with stable ammonia decomposition materials at 550-800°C (1022-1472°F). The specific objectives of the project are to: (i) develop combined sorbent-catalyst materials capable of removing hydrogen sulfide to less than 20 ppmv and ammonia by at least 90 percent. (ii) Carry out comparative fixed-bed studies of absorption and regeneration with various formulations of sorbent-catalyst systems and select most promising sorbent-catalyst type. (iii) Conduct long-term (at least 30 cycles) durability and chemical reactivity in the fixed-bed with the superior sorbent-catalyst.

7110 (DOE/PC/79819–12) **Bench-scale development of coal/oil co-processing technology. Twelfth quarterly report, 1 July–30 September 1990.** Duddy, J.E.; Panvelker, S.V. Hydrocarbon Research, Inc., Princeton, NJ (United States). Nov 1990. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-87PC79819. Order Number DE95005204. Source: OSTI; NTIS; GPO Dep.

This quarterly progress report presents the status of work on the Bench-Scale Development of Coal/Oil Co-Processing Technology. The technology being developed is the HRI Coal/Oil Co-Processing Technology based on two-stage catalytic, ebullated-bed processing. Bench-scale work is being performed at Hydrocarbon Research, Inc. (HRI) with laboratory-scale support work by the Alberta Research Council (ARC). Activities during the 12th quarter of this project have included the following: A contract modification was executed to extend the program through the end of 1990 and to add a bench-scale operation; A draft of the Topical Report No. 1 was delivered to DOE; Bench Run No. 9 was completed evaluating the effect of coal concentration on reactivity in once-through operations.

7111 (DOE/PC/89788–T15) **Novel process for depolymerization of coal to C_2-C_4 hydrocarbons. Final report, 1 September 1989–31 August 1993.** Wiser, W.H.; Oblad, A.G. Utah Univ., Salt Lake City, UT (United States). 8 Jul 1994. 238p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-89PC89788. Order Number DE95000355. Source: OSTI; NTIS; GPO Dep.

A principal objective of this work was to study the conversion of coal to $C_2 - C_4$ hydrocarbons in a two-stage reactor system. Coal was converted to liquids at 440°C in a stirred batch autoclave using tetralin as the hydrogen donor solvent. The liquids produced were separated from the unreacted coal and ash by filtration. The liquids were then fed into a second stage fixed bed reactor containing sulfided Ni-Mo/Al_2O_3 and SiO_2-Al_2O_3 catalyst. The liquids

were hydrocracked on the dual functional catalyst giving high yields of C_2 – C_4. hydrocarbons. The pressure was 1800 psi and the temperatures were in the range of 425 to 500°C. The kinetic parameters of the conversion of coal liquids to gases were determined. The activation energy was determined.

7112 (DOE/PC/89903–T16) **Molecular biological enhancement of coal desulfurization: Cloning and expression of the sulfoxide/sulfone/sulfonate/sulfate genes in pseudomonads and Thiobacillae. First quarterly report, July 1989–September 1989.** Krawiec, S. Lehigh Univ., Bethlehem, PA (United States). Center for Molecular Bioscience and Biotechnology. 20 Oct 1989. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-89PC89903. Order Number DE95004453. Source: OSTI; NTIS; GPO Dep.

This contract was established on July 20, 1989. This first quarterly report pertains to the isolation, identification, and acquisition of organisms, perceived refinements to the fluorescent spray plate technique, optimization of mating protocols, production of autotrophs, refinement of procedures for the isolation of plasmids, and definition of procedures to be used in the identification and use of R primes.

7113 (DOE/PC/89903–T17) **Molecular biological enhancement of coal desulfurization: Cloning and expression of the sulfoxide/sulfone/sulfonate/sulfate genes in pseudomonads and Thiobacillae. Third quarterly report, January 1990–March 1990.** Krawiec, S. Lehigh Univ., Bethlehem, PA (United States). Center for Molecular Bioscience and Biotechnology. 20 Apr 1990. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-89PC89903. Order Number DE95004454. Source: OSTI; NTIS; GPO Dep.

This contract was established on July 20, 1989. This first quarterly report pertains to the isolation, identification, and acquisition of organisms, perceived refinements to the fluorescent spray plate technique, optimization of mating protocols, production of autotrophs, refinement of procedures for the isolation of plasmids, and definition of procedures to be used in the identification and use of R primes. A mating regime has been developed which effectively selects against soil transconjugants serving as donors and for recipients derived from P. aeruginosa 278583. Three methionine auxotrophs and a histidine auxotroph have been generated in P. aeruginosa 27853 by transposon mutagenesis. A new lysis by alkali method has been successfully used to prepare plasmids R68.45, pLA2917, and pRK2013.

7114 (DOE/PC/89903–T18) **Molecular biological enhancement of coal desulfurization. Final report.** Krawiec, S. Lehigh Univ., Bethlehem, PA (United States). Dept. of Molecular Biology. [1995]. 47p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-89PC89903. Order Number DE95004455. Source: OSTI; NTIS; GPO Dep.

Fresh isolates of bacteria presumptively identified as R. erythropolis unequivocally have a $DbtS^+$ phenotype. The production of OH-BP from either DBT or $DBTO_2$ was confirmed by difference spectroscopy, HPLC, and mass spectrometry. The temperature, pH, and means of supplying the thiophenic or sulfonic sole source of sulfur were optimized. The maximal rate of growth of the organism, its affinity for sulfone, and the extent to which substrate was converted to product were determined by using batch, fed batch, and continuous cultures. For strain N1-36, the maximum specific growth rate was 0.235 hr^{-1} which corresponds to a minimal generation time of 2.95 hr. The K_s was estimated to be 0.39 μM. With 100 μM DBT as the sole sulfur source, approximately 40 μM OH-BP are produced (after 40 hr of growth); with 100 μM $DBTO_2$ as the sole sulfur source, approximately 70 μM OH-BP are produced (after 40 hr of growth). The desulfurization activity is repressed by $SO_4^=$ OH-BP does not serve as a carbon source. The $DbtS^+$ phenotype of the R. erythropolis isolates is stable and discrete. The isolates selectively remove sulfur from DBT, a compound which models a refractory form of organic sulfur in compounds characteristic of fossil fuels. The desulfurization occurs with no oxidation of carbon-carbon bonds. The stability and specificity (along with genetic regulation) indicate that microbial desulfurization in a real phenomenon in which a noxious element is removed without significantly affecting the calorific value of the substrate. Additional characterization (and optimization) would provide the basis of a very important form of fossil fuel beneficiation.

7115 (DOE/PC/91027–1) **Macromolecular structure analysis and effective liquefaction pretreatment. Quarterly technical progress report, 1 January 1991–31 March 1991.** Suuberg, E.M.; Yu, Y.; Lilly, W.D. Brown Univ., Providence, RI (United States). Div. of Engineering. [1991]. 26p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-91PC91027. Order Number DE95005702. Source: OSTI; NTIS; GPO Dep.

This project studies swelling of coals by solvents with application to coal liquefaction. Solvent swelling offers a measure of how well the insoluble 3-D network structure of coal has been disrupted. Preliquefaction swelling of coals can also be a valuable processing step: it may be used to introduce catalysts into the structure, or merely to loosen the structure so that donor solvent entry is promoted or retrograde reactions are inhibited. A class of solvents was investigated for introducing highly dispersed catalysts into the structure of coal: short-chain alkyl naphthalenes and alcohol-alkyl naphthalene mixtures; Utah Blind Canyon coal was used. Effects of thermal treatment on macromolecular structure of coal was also investigated, using combined differential scanning calorimetry and solvent swelling. Results on bituminous coals show that this combination can provide new insights into the complicated prepyrolysis or preliquefaction changes that occur in coals.

7116 (DOE/PC/91027–2) **Macromolecular structure analysis and effective liquefaction pretreatment. Quarterly technical progress report, 1 April 1991–30 June 1991.** Suuberg, E.M.; Yun, Y.; Lilly, W.D. Brown Univ., Providence, RI (United States). Div. of Engineering. [1991]. 20p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-91PC91027. Order Number DE95005703. Source: OSTI; NTIS; GPO Dep.

Differential scanning calorimetry (DSC) and solvent swelling were used to evaluate structural changes at low temperatures (<350 C) before any major pyrolytic bond breakage occurs. Results reveal existence of reversible structural changes together with an irreversible transition, centered around 200-300 C in three high volatile bituminous coals, and 300 to 400 C in higher rank bituminous coals. DSC thermograms appear to correlate with THF swelling profiles, to furnish information on structural relaxation. The temperature of the structural relaxation appears lower than that for major thermal degradation under atmospheric pressure.

7117 (DOE/PC/91027–3) **Macromolecular structure analysis and effective liquefaction pretreatment. Quarterly technical progress report, 1 July 1991–30 September 1991.** Suuberg, E.M.; Yun, Y.; Lilly, W.D. Brown Univ., Providence, RI (United States). Div. of Engineering. [1991]. 31p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-91PC91027. Order Number DE95005704. Source: OSTI; NTIS; GPO Dep.

Studies were carried out on effects of heating rate and solvent swelling on glass transition in coal and on elastic behavior of coals in mercury porosimeter.

7118 (DOE/PC/91027–4) **Macromolecular structure analysis and effective liquefaction pretreatment. Annual technical report, [October 1991–December 1991].** Suuberg, E.M.; Yun, Y.; Lilly, W.D. Brown Univ., Providence, RI (United States). Div. of Engineering. Feb 1992. 64p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-91PC91027. Order Number DE95005705. Source: OSTI; NTIS; GPO Dep.

This report is divided into 5, stand-alone chapters. After a chapter on the approach of the project, the nd chapter presents an introduction to combining different techniques for analyzing pre- pyrolysis changes in macromolecular configuration. The 3rd chapter amplifies on the nd chapter and considers the behavior of a wider range of ranks. The 4th chapter concerns synergistic effects of mixed solvents in inducing desired structural changes in coals (CS_2 + electron donor solvents; aromatic hydrocarbon-alcohol or HC-alcohol mixtures). Finally, the 5th chapter is a brief on the efforts to characterize the structure of coals using elasticity measurements.

7119 (DOE/PC/91027–5) **Macromolecular structure analysis and effective liquefaction pretreatment. Quarterly technical progress report, 1 January 1992–31 March 1992.** Suuberg, E.M.;

Yun, Y.; Lilly, W.D. Brown Univ., Providence, RI (United States). Div. of Engineering. [1992]. 32p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-91PC91027. Order Number DE95005706. Source: OSTI; NTIS; GPO Dep.

This report is divided into: effects of aerial oxidation on macromolecular structure of pretreated coals, and physical transitions in low-rank coals. Heat-treated (structurally relaxed) coals are sensitive to aerial oxidation, but on a scale of hours, not minutes, even above 100 C. Upper Freeport coal's swellability was enhanced by oxidation, its extractability decreased; Pittsburgh No. 8 coal's swellability was decreased, its extractability largely unaffected. it is suggested that aerial oxidation is concerned with certain specific components in coal structure, irrespective coal rank or pretreatment. DSC results on as-recieved low-rank coals were overshadowed by a large endothermic peak of water evaporation up to 250 C.

7120 (DOE/PC/91027–6) **Macromolecular structure analysis and effective liquefaction pretreatment. Quarterly technical progress report, 1 April 1992–30 June 1992.** Suuberg, E.M.; Yun, Y.; Lilly, W.D. Brown Univ., Providence, RI (United States). Div. of Engineering. [1992]. 42p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-91PC91027. Order Number DE95005707. Source: OSTI; NTIS; GPO Dep.

Experiments show that combined DSC-solvent swelling provide insight into heat- and solvent-induced macromolecular structural changes in coal. In Pittsburgh No. 8 bitu. coal, there is a structural transition at 250 to 400 C. There are thermally induced (prepyrolysis) structural relaxations in bituminous coals at 270-430 C that make them more easily penetrable, swellable, and extractable in solvents. These relaxations are not observed in subbituminous and lignite; in these low-rank coals, gradual crosslinking with temperature was dominant. In medium and low volatile bituminous rank, the relaxation was much more pronounced. As in polymers, the relaxation transitions in coals depend strongly on heating rate. No relaxation was caused by pyridine preswelling of coals of rank higher than high volatile bituminous. Heat appears to disrupt the structure more than pyridine can; CS_2/pyridine however, relaxes the structure of Upper Freeport coal. Even strong solvents cannot swell high-rank coals more than 10% at <250 C, whereas heat treatment above 300 C and mixed solvents enhance the swellability. Origin of efficacy in swelling of a medium volatile rank coal by mixed solvents of CS_2 appears to be physical; similar bonding interactions are disrupted by this synergistic solvent action and by heat.

7121 (DOE/PC/91027–7) **Macromolecular structure analysis and effective liquefaction pretreatment. Quarterly technical progress report, 1 July 1992–30 September 1992.** Suuberg, E.M.; Yun, Y.; Lilly, W.D. Brown Univ., Providence, RI (United States). Div. of Engineering. [1992]. 19p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-91PC91027. Order Number DE95005708. Source: OSTI; NTIS; GPO Dep.

This 7th quarterly report mainly deals with elastic properties of coal measured by Dynamic Mechanical Analysis (DMA), Differential Scanning Calorimetry (DSC), and solvent swelling, for two bituminous coals. More detailed aerial oxidation effects and sample pressing effects in DSC are also described. A transition related to coal moisture loss is more visible in DMA and solvent swelling than in DSC. Good reproducibility in DMA depends on reproducibility of forming sample pellets; small cracks was a problem.

7122 (DOE/PC/91027–8) **Macromolecular structure analysis and effective liquefaction pretreatment. Eighth quarterly technical progress report, [October–December 1992].** Suuberg, E.M. Brown Univ., Providence, RI (United States). Div. of Engineering. 11 Jun 1993. 28p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-91PC91027. Order Number DE95005709. Source: OSTI; NTIS; GPO Dep.

This project deals with the nature of bond cleavage and formation that occur during heating of coals under liquefaction conditions. This report summarizes the use of differential scanning calorimetry (DSC) and solvent swelling. Results are reported separately for bituminous coals and lower ranks. DSC in as-received low-rank coals were overshadowed by a large endothermic peak due to water evaporation up to 250 C. Solvent swelling indicates that crosslinking predominates >150 C; thus thermal pretreatment may not be advantageous. Solvent preswelling of some low rank coals in pyridine may offer some small advantages in terms of increase pyrolysis liquid yields. Presence of solvent during flash pyrolysis may suppress some of the crosslinking reactions.

7123 (DOE/PC/91029–T3) **Refining and end use of coal liquids. Quarterly report, April–June 1994.** Bechtel Corp., San Francisco, CA (United States). [1995]. 23p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-93PC91029. Order Number DE95005521. Source: OSTI; NTIS; GPO Dep.

Bechtel, with Southwest Research Institute, Amoco Oil R&D, and the M.W. Kellogg Co. as subcontractors, initialed a study on November 1, 1993, for the U.S. Department of Energy's (DOE's) Pittsburgh Energy Technology Center (PETC) to determine the most cost effective and suitable combination of existing petroleum refinery processes needed to make specification transportation fuels or blending stocks, from direct and indirect coal liquefaction product liquids. This 47-month study, with an approved budget of $4.4 million dollars, is being performed under DOE Contract Number DE-AC22-93PC91029. A key objective is to determine the most desirable ways of integrating coal liquefaction liquids into existing petroleum refineries to produce transportation fuels meeting current and future, e.g. year 2000, Clean Air Act Amendment (CAAA) standards. An intregral part of the above objectives is to test the fuels or blends produced and compare them with established ASTM fuels. The comparison will include engine tests to ascertain compliance of the fuels produced with CAAA and other applicable fuel quality and performance standards. The final part of the project includes a detailed economic evaluation of the cost of processing the coal liquids to their optimum products. The cost analyses is for the incremental processing cost; in other words, the feed is priced at zero dollars. The study reflects costs for operations using state of the art refinery technology; no capital costs for building new refineries is considered. Some modifications to the existing refinery may be required. Economy of scale dictates the minimum amount of feedstock that should be processed.

7124 (DOE/PC/91039–T11) **Highly dispersed catalysts for coal liquefaction. Quarterly report No. 12, May 23, 1994–August 22, 1994.** Hirschon, A.S.; Wilson, R.B. SRI International, Menlo Park, CA (United States). 18 Oct 1994. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-91PC91039. Order Number DE95005768. Source: OSTI; NTIS; GPO Dep.

Objectives are to study the effect of pretreatment methods on the two- stage liquefaction process; in particular, the effects of dispersed catalysts and carbon monoxide atmospheres. This report concentrated on Tasks 1 and 2: analytical support and laboratory scale operation (Fe, Mo, Ni catalysts).

7125 (DOE/PC/91050–T8-Vol.1) **Advanced direct coal liquefaction concepts. Executive summary, Volume 1.** Berger, D.J. (Canadian Energy Development, Inc., Edmonton, AB (Canada)); Parker, R.J.; Simpson, P.L. Canadian Energy Development, Inc., Edmonton, AB (Canada); Alberta Research Council, Edmonton, AB (Canada). Jul 1994. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-92PC91050. Order Number DE95004256. Source: OSTI; NTIS; GPO Dep.

The economics and oil yields of advanced coal liquefaction are described.

7126 (DOE/PC/91050–T8-Vol.4) **Economic feasibility study: CFR advanced direct coal liquefaction process. Volume 4.** Canadian Energy Development, Inc., Edmonton, AB (Canada); Alberta Research Council, Edmonton, AB (Canada); Kilborn Ltd., Toronto, ON (Canada). Sep 1994. 107p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-92PC91050. Order Number DE95004258. Source: OSTI; NTIS; GPO Dep.

Preliminary technical and economic data are presented on the CFR Advanced Coal Liquefaction Process. Operating cost estimates and material balances are given.

7127 (DOE/PC/91050–T9) **Advanced direct coal liquefaction concepts. Quarterly report, April 1–June 30, 1994.** Berger, D.J. (Canadian Energy Development, Inc., Edmonton, AB

(Canada)); Parker, R.J.; Simpson, P.L. Canadian Energy Development, Inc., Edmonton, AB (Canada); Alberta Research Council, Edmonton, AB (Canada). [1994]. 64p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-92PC91050. Order Number DE95005560. Source: OSTI; NTIS; GPO Dep.

The experimental part of the project was completed this quarter. The technical and economic assessment of the process is in progress. Work is well advanced on the preparation of the final report and Phase 2 proposal. Two stage liquefaction of Illinois No. 6 coal was successfully accomplished using a flow-through stirred autoclave system for the first stage followed by a counterflow reactor in the second stage. With this arrangement, coal conversions in the range of 93–95% were achieved with distillable oil yields up to 51% wt on MAF coal. It is believed that higher distillable oil yields should be achievable with solvent recycle and/or more optimized operating conditions.

7128 (DOE/PC/91054–T12) **Effect of pretreating of host oil on coprocessing. Quarterly progress report, July 1–September 30, 1994.** Wender, I.; Tierney, J.W. Pittsburgh Univ., PA (United States). Dept. of Chemical and Petroleum Engineering. 24 Oct 1994. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-91PC91054. Order Number DE95005189. Source: OSTI; NTIS; GPO Dep.

The principal objective of this research is to gain information on the role that host petroleum-derived oils (1,000 F+), as well as that of catalytically treated host oils, play when used as liquefaction solvents in coprocessing with coal. The host oil will be extensively characterized and then pretreated in ways which involve catalytic reactions such as hydrogenation and hydrocracking. The pretreated oils will then be characterized by elemental analysis, catalytic dehydrogenation, distillation, GC-MS, and NMR. The effect of the host oil on coprocessing with coal will be compared to that obtained using catalytically modified host oils. When appropriate, model compounds will be used to study specific reactions brought about by the pretreatments. Experimental methods, materials, and results to date are described.

7129 (DOE/PC/91055–T9) **The role of the resid solvent in coprocessing with finely divided catalysts. Quarterly report, July–September, 1994.** Curtis, C.W. Auburn Univ., AL (United States). Dept. of Chemical Engineering. [1994]. 30p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-91PC91055. Order Number DE95005176. Source: OSTI; NTIS; GPO Dep.

This progress report describes the continuation of coal-resid coprocessing reactions which have been performed during the last two quarters. During the past two quarters, Maya and FHC-623 resids were evaluated as whole resids and as the hexane soluble fractions in noncatalytic and catalytic reactions at 400 C with Pittsburgh No. 8 bituminous coal and Blind Canyon bituminous coal. During this current quarter, reactions have been performed with the saturate fraction of these resids. In order to evaluate the role of the different components in resids, the hexane fractions of the resids were separated into saturate and aromatic fractions. The saturate fraction should contain the majority of the naphthenes present in the resid. The saturate fractions were reacted with coal at the same liquefaction conditions as the whole resids and the hexane soluble fractions of the resid. In the catalytic reactions, a Mo naphthenate precursor was used in the presence of sulfur. The catalyst generate din situ was MoS_2. The effect of different reaction conditions on the resid was monitored by gas chromatography in which the retention times of the eluting peaks were determined. The amount of eluent present at different retention times was determined and compared. The effect of the resid solvent system and catalytic treatment on coal behavior during liquefaction was determined by the amount of coal conversion to THF solubles and solvent fractionation of the reaction products.

7130 (DOE/PC/91056–T7) **Molecular catalytic coal liquid conversion. Quarterly progress report.** Stock, L.M.; Yang, S. Chicago Univ., IL (United States). Dept. of Chemistry. 30 Jun 1994. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-91PC91056. Order Number DE95005175. Source: OSTI; NTIS; GPO Dep.

Research work has concentrated on the two general tasks that were described in the original proposal. The first task concerns the development of molecular organometallic homogeneous catalysts that can be used in the hydrogenation of coal liquids. The second concerns non-metallic organic bases which can activate dihydrogen for arene hydrogenation, and that can also be used in the conversion of coal liquids. A series of organometallic compounds which were reported to exhibit good catalytic activities for the homogeneous hydrogenation of aromatic hydrocarbons have been synthesized and characterized. Current research on the second task was designed to investigate whether such basic reagents ranging from hydroxide to hydrosulfide ion and amide ion can accomplish the addition of dihydrogen to pure compounds and coal liquids and to simultaneously remove heteroatoms from them. The authors worked this quarter to study the influence of temperature, hydrogen pressure, catalyst concentration, as well as the character of the solvent on the hydrogenation of naphthalene to tetralin. The results are shown.

7131 (DOE/PC/91281–T12) **Low severity coal liquefaction promoted by cyclic olefins. Quarterly report, July–September, 1994.** Curtis, C.W. Auburn Univ., AL (United States). Dept. of Chemical Engineering. [1994]. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-91PC91281. Order Number DE95005196. Source: OSTI; NTIS; GPO Dep.

Previous research indicates that the cyclic olefin, 1,4,5,8,9,10-hexahydroanthracene (HHA), is one of the most effective hydrogen donors tested under low severity conditions. A mild acidic pretreatment of the coal prior to liquefaction has proven to be significant in increasing conversion of low rank coals under low severity conditions as well. Coal conversion can also be improved by employing hydrotreating catalysts. In this study, reactions with coal mild acidic pretreatment were performed with cyclic olefins with and without catalysts. These reactions provided the data to prove whether catalysts are effective under low severity conditions. Evaluating the effect of these three factors (mild acidic pretreatment, hydrogen donation by cyclic olefins, and the use of slurry phase catalysts) on the reactivity of low severity coal liquefaction was the basis of this study. By examining the results, it is clear that the combination of all of the most favorable factors produced coal conversions of more than 50%. The effectiveness of HHA was tested by performing reactions without a cyclic olefin which produced substantially lower coal conversion, thus proving how effective hydrogen donation by cyclic olefins is in low severity coal liquefaction. The mild acidic pretreatment demonstrated its effectiveness on increasing the conversion low rank coals. By promoting higher conversion for the lignite than for the subbituminous coal, suggested that the lower the rank is, the better mild acidic pretreatment works. The catalyst MoNaph proved its effectiveness in low severity coal liquefaction, too, although the reactions with the other slurry phase catalysts NiOct was not effective. Also, synergy among the mild acid pretreatment, HHA and MoNaph occurred yielding high coal conversions for both coals.

7132 (DOE/PC/91288–T14) **High temperature electrochemical separation of H_2S from coal gasification process streams. Quarterly progress report, July 1, 1994–September 30, 1994.** Winnick, J. Georgia Inst. of Tech., Atlanta, GA (United States). School of Chemical Engineering. [1994]. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-91PC91288. Order Number DE95005770. Source: OSTI; NTIS; GPO Dep.

A method of polishing coal synthesis gas by an electrochemical membrane operation is being perfected. The operation takes advantage of an electrochemical potential gradient rather than conventional techniques, separating the H_2S from the coal gas stream, leaving only H_2 to enrich the exiting fuel gases. Sulfur is the by-product that is carried away by a separate inert sweep gas and condensed downstream. The technology is attractive due to simplicity as well as economics when compared to alternatives. Experimental analysis was not possible this quarter due to a change of laboratories. This change makes possible improved experimental conditions. Predominant work dealt with improving the current process, improving the oven structure to accommodate a controlled

atmosphere heating, regulating oven conditions using resistance control, etc.

7133 (DOE/PC/91311–T12) **Configurational diffusion of asphaltenes in fresh and aged catalyst extrudates. Quarterly progress report, 20 June 1994–20 September 1994.** Guin, J.A. Auburn Univ., AL (United States). Dept. of Chemical Engineering. [1994]. 22p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-91PC91311. Order Number DE95005184. Source: OSTI; NTIS; GPO Dep.

Asphaltenes are a complex multi-component diffusion system, and thus to obtain a better understanding of such a complex system, the author developed a mathematical adsorption-diffusion simulation model for multi-component systems. A numerical method was developed for the solution of the mathematical model. The model developed for the multi-component system is an extension of the work performed during the past year concerning adsorptive-diffusion systems. The effects of model parameters on the model solution were studied theoretically. It was found that the uptake rate of a component was not only dependent on the diffusion rate, but also on the adsorption capacity and molecule size. The interaction between diffusion rate, adsorption capacity and molecule size may result in crossover(s) for uptake rate of one component with other components during the adsorption-diffusion process. Next quarter uptake experiments using asphaltenes will be performed. A simplified mathematical diffusion model for complicated mixtures such as asphaltenes will be developed and numerically solved. The diffusion behavior of asphaltenes in catalyst pores will be studied by fitting the experimental data with the diffusion model.

7134 (DOE/PC/92147–7) **Catalytic multi-stage liquefaction of coal. Seventh quarterly report-final, April 1, 1994–June 30, 1994.** Comolli, A.G.; Johanson, E.S.; Lee, L.K.; Pradhan, V.R.; Stalzer, R.H. Hydrocarbon Research, Inc., Princeton, NJ (United States). Jul 1994. 50p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-93PC92147. Order Number DE95005205. Source: OSTI; NTIS; GPO Dep.

The overall objective of this program is to produce liquid fuels from coal by direct liquefaction at a cost that is competitive with conventional fuels. Specifically, this continuous bench-scale program contains provisions to examine new ideas in areas such as: low temperature pretreatments, more effective catalysts, on-line hydrotreating, new coal feedstocks, other hydrogen sources, more concentrated coal feeds and other highly responsive process improvements while assessing the design and economics of the bench-scale results. This quarterly report covers work on Laboratory Scale Studies, Continuous Bench-Scale Operations, Technical Assessment and Project Management.

7135 (DOE/PC/92246–T6) **Development of enhanced sulfur rejection processes. Final technical progress report, fifth quarter, October 1–December 31, 1993.** Yoon, R.H.; Luttrell, G.; Adel, G.; Richardson, P.E. Virginia Center for Coal and Minerals Processing, Blacksburg, VA (United States). Oct 1994. 46p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-92PC92246. Order Number DE95005181. Source: OSTI; NTIS; GPO Dep.

Two complementary concepts for improving the removal of inorganic sulfur from many eastern US coals are the Electrochemically Enhanced Sulfur Rejection (EESR) and Polymer Enhanced Sulfur Rejection (PESR). The EESR process uses electrochemical techniques to suppress the formation of hydrophobic oxidation products believed to be responsible for the floatability of coal pyrite. The PESR process uses polymeric reagents that react with pyrite and convert floatable middlings (composite particles composed of pyrite with coal inclusions) into hydrophilic particles. It is believed that these processes can be used simultaneously to maximize the rejection of both well-liberated pyrite and composite coal-pyrite particles. During the current reporting period, work was conducted in the following areas: studies of the liberation characteristics of various pyrite samples, identification of oxidation products on pyrite using XPS technique, studies of reagent adsorption on pyrite using FTIR and contact angles, identification of the most effective sacrificial anode material for depressing pyrite, and identification of the most effective polymer for depressing pyrite. Some of the more significant findings made during the current reporting periods are as follows: (1) liberation characteristics of Illinois No. 6 coal have been determined, (2) effects of pH and electrochemical potentials on the flotation of coal and mineral pyrite have been established, (3) an effective method of keeping coal pyrite under reducing conditions and, hence, preventing self-induced flotation has been developed, and (4) an effective polymeric pyrite depressant has been identified.

7136 (DOE/PC/92527–T8) **Hindered diffusion of coal liquids. Quarterly report No. 8, June 18, 1994–September 17, 1994.** Tsotsis, T.T. (University of Southern California, Los Angeles, CA (United States). Dept. of Chemical Engineering); Sahimi, M.; Webster, I.A. University of Southern California, Los Angeles, CA (United States). Dept. of Chemical Engineering. [1994]. 26p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-92PC92527. Order Number DE95006205. Source: OSTI; NTIS; GPO Dep.

Experiments on transport of coal- and petroleum-derived asphaltenes using catalytic membranes were continued. Results did not agree with published data. Aggregations/delamination phenomena of asphaltenes in resins and in solution were studied. Extensive Monte Carlo calculations were carried out of the adsorption of large aggregates and molecules both in a single pore and in a porous medium consisting of a large number of pores. Diffusion coefficients were very sensitive to pore space characteristics.

7137 (DOE/PC/92550–8) **Evaluation of hyperbaric filtration for fine coal dewatering. Eighth quarterly technical progress report, July 1, 1994–September 30, 1994.** Parekh, B.K. (Univ. of Kentucky, Lexington, KY (United States)); Leonard, J.W.; Hogg, R.; Fonseca, A. Kentucky Univ., Lexington, KY (United States). Research Foundation. [1995]. 26p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-92PC92550. Order Number DE95005201. Source: OSTI; NTIS; GPO Dep.

Most of the coal presently used by the utility industry is cleaned at preparation plants employing wet processes. Water, while being the mainstay of coal washing, is also one of the least desirable components in the final product. Coarse coal (+3/4 inch) is easily dewatered to a 3-4 percent moisture level using conventional vibrating screens and centrifuges. However, the main problem of excess product moisture occurs in fine (minus 28 mesh) coal and refuse. Even though fines may constitute only about 20 percent of a contemporary cleaning plant feed, they account for two-thirds of the product surface moisture. This high surface moisture offsets many of the benefits of coal cleaning, and can easily undercut the ongoing programs on recovery of fine clean from refuse as well as producing an ultra-fine super clean coal fuel. Currently, most of the coal preparation plants utilize vacuum disk or drum filter technology for dewatering of the fine coal, providing dewatered product containing about 25 percent moisture. The coal industry would prefer to have a product moisture in the range of 10 to 15 percent. Although the desired product quality can be obtained using thermal dryer, there are problems associated with this technology such as high capital costs and a source of air pollution. In the present research project, an alternative to thermal drying, hyperbaric filtration which has shown potential in lowering moisture content in fine coal to less than 20 percent level, is being investigated in detail. The project will develop fundamental information on particle-liquid interaction during hyperbaric filtration and apply the knowledge in developing optimum conditions for the pilot plant testing of the hyperbaric filter system.

7138 (DOE/PC/93054–4) **A characterization and evaluation of coal liquefaction process streams. Quarterly technical progress report, June 29–September 30, 1994.** Robbins, G.A.; Brandes, S.D.; Winschel, R.A.; Burke, F.P. CONSOL, Inc., Library, PA (United States). Oct 1994. 16p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-94PC93054. Order Number DE95005173. Source: OSTI; NTIS; GPO Dep.

The objectives of this project are to support the DOE direct coal liquefaction process development program and to improve the interaction between direct coal liquefaction process development and analytical chemistry. Independent analyses of well-established methods will be obtained of samples produced in direct coal liquefaction processes under evaluation by DOE. Additionally, analytical instruments and techniques which are currently underutilized for

the purpose of examining coal-derived samples will be evaluated. The data obtained from this study will be used to help guide current process development and to develop an improved data base on coal and coal liquids properties. A sample bank will be established and maintained for use in this project and will be available for use by other researchers. The reactivity of the non-distillable resids toward hydrocracking at liquefaction conditions (i.e., resid reactivity) will be examined. From the literature and data experimentally obtained, a mathematical kinetic model of resid conversion will be constructed. It is anticipated that such a model will provide insights useful for improving process performance and thus the economics of direct coal liquefaction. Progress during the first quarter of the contract period is described.

7139 (DOE/PC/94207–T1) **High temperature electrochemical polishing of H_2S from coal gasification process streams. Quarterly progress report, August 1, 1994–September 30, 1994.** Winnick, J. Georgia Inst. of Tech., Atlanta, GA (United States). School of Chemical Engineering. [1994]. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-94PC94207. Order Number DE95006242. Source: OSTI; NTIS; GPO Dep.

A high temperature electrochemical cell capable of polishing hydrogen sulfide from fuel gas streams is being perfected. The operation, to be used in compliance with high efficiency energy conversion systems, takes advantage of an electrochemical potential gradient instead of typical separation techniques to separate hydrogen sulfide from the fuel gas stream leaving hydrogen to enrich the exiting gases. Vaporoussulfur is the by-product carried downstream by a separate inert sweep gas and condensed. The Electrochemical Membrane Separator (EMS), the focus of experimental work, purges a fuel gas contaminated with H_2S. This is done by reducing the most electro-active species in the gas stream. In this case, H_2S is reduced by the following: $H_2S + 2e^- \rightarrow H_2 + S^{2-}$. A membrane which contains sulfide ions in a molten salt electrolyte will act to transport the ions across to the anode. If the membrane is impermeable to H_2 diffusion from the cathode side, an inert sweep gas can be used to carry the vaporous oxidized sulfur downstream to be condensed. Work began this quarter to improve experimental conditions (laboratory & equipment enhancement). The oven containing the (EMS) is the main focus of improvement readjusting spatial requirements conforming to the controlled environmental emissions equipment while creating a controlled atmosphere gauntlet to unfavorable reactions with electrolytic species.

7140 (FAAR–23/1993, pp. 87-91) **Aerosol particle characteristics from pressurised fluidised bed coal gasification.** Lind, T. (Technical Research Centre of Finland, Espoo (Finland). Aerosol Technology Group); Kauppinen, E.I.; Jokiniemi, J.K.; Kurkela, E.; Pakkanen, T.; Berner, A. Finnish Association for Aerosol Research, Espoo (Finland). 1993. (CONF-9306401–: 5. Finnish national aerosol symposium, Espoo (Finland), 1-3 Jun 1993). In *Report series in aerosol science.* 292p. Order Number DE95737628. Source: OSTI; NTIS.

A method was developed to sample aerosol particles from the pressurised fluidised bed gasification (PFG) product gas in process conditions up to 1.0 MPa and 700 deg C. The aerosol pressure and temperature were kept constant in order to avoid aerosol transformations during sampling. The experiments were conducted in Otaniemi PDU-scale PFG test facility operated at 0.5 MPa. Three different coals were gasified during the experiments. Limestone was used as sorbent material in experiments with two of the coals. The results indicate, that the mass size distributions of the aerosol particles formed in coal PFG consist of at least two modes in the size range D_p = 0.6-10 μm, one at about 5 μm, the other one in the sub micron size range. The calcium and potassium contents of high temperature impactor (HTI) collected samples were analysed for dilute HNO_3 soluble fractions with GFAAS. The calcium content of the aerosol particles was almost size independent in the particles smaller than 10 μm, whereas potassium showed enrichment in small particles.

7141 (FAAR–23/1993, pp. 119-124) **Moving granular bed filter research at Delft University of Technology.** Nykaenen, J. (Imatran Voima Oy, Vantaa (Finland). Air Pollution Control Group); Zevenhoven, C.A.P.; Andries, J.; Hein, K.R.G. Finnish Association for Aerosol Research, Espoo (Finland). 1993. (CONF-9306401–: 5. Finnish national aerosol symposium, Espoo (Finland), 1-3 Jun 1993). In *Report series in aerosol science.* 292p. Order Number DE95737628. Source: OSTI; NTIS.

The granular bed filter research at Delft University of Technology (DUT) was started in 1987. The main task of the current work is to determine the effect of changes in the combustion process on particle removal efficiency of the Moving Granular Bed Filter (MGBF). The efficiency of the filter is determined while burning subbituminous or bituminous coals, or coal together with biomass. One goal is to study the particle removal rate while burning with recirculated carbon dioxide and oxygen instead of air. To find out the effect of partial gasification, CO_2O_2 combustion is carried out also at substoichiometric conditions. In addition, the project includes the comparison of the removal efficiencies of a ceramic filter and MGBF. And finally, the alkali concentrations before and after both particle removal equipments are measured. First tests with the MGBF at high temperature and high pressure show that there are still problems in operating MGBF continuously in PFBC-conditions. The efficiency was reduced by re-entrained agglomerates and the cleaning Or granules included some difficulties. Nevertheless, it was shown that MGBF allows for operation at constant pressure drop.

7142 (KE–93003G) **A study on the briquetting by improving the carbonization.** Son, E.K. (Korea Institute of Energy Research, Taejon (Korea, Republic of)); Lee, S.H.; Park, J.S.; Lim, Y.J. No corporate text available. Dec 1993. 102p. (In Korean). Order Number DE95744271. Source: OSTI; NTIS (US Sales Only).

The molten caustic leaching(MCL) process using NaOH as leachant was tested in order to improve the quality of Korean anthracite. The properties of Korean anthracite were changed significantly after treatment with MCL except for the graphitic coal. (author). refs., figs., tabs.

0106 Properties and Composition

Refer also to citation(s) 7087, 7100, 7119, 7120, 7121, 7122, 7136, 7138, 7175

7143 (DOE/MT/92019–T2) **Effect of coal beneficiation process on rheology/atomization of coal water slurries. Quarterly progress report, August 1–October 31, 1994.** Ohene, F. Grambling State Univ., LA (United States). Dept. of Chemistry. [1994]. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-92MT92019. Order Number DE95005193. Source: OSTI; NTIS; GPO Dep.

The overall objective of this project is to perform experiments to understand the effect of coal beneficiation processes and high shear rheological properties on the atomization of coal-water slurries (CWS). In the atomization studies, the mean drop size of the CWS sprays will bed determined at various air-to-CWS ratios. A correlation between the high shear rheological properties, particle size distributions and the atomization will be made in order to determine the influence of these parameters on the atomization of CWS. During this past quarter, experimental studies on pressure dependent atomization of coal-water slurries and simulated fluids were continued. Surface tension, oscillatory, high and low shear flow behavior of the slurries were also performed.

7144 (DOE/PC/90287–T15) **Further studies of the effects of oxidation on the surface properties of coal and coal pyrite.** Herrera, M.N. California Univ., Berkeley, CA (United States). 1994. 239p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-90PC90287. Order Number DE95006248. Source: OSTI; NTIS; GPO Dep.

The objective of this research was to investigate the oxidation behavior of coal and coal pyrite and to correlate the changes in the surface properties induced by oxidation, along with the intrinsic physical and chemical properties of these organic and inorganic materials, with the behavior in physical coal cleaning processes. This provide more fundamental knowledge for understanding the way in which different factors interact in a medium as heterogeneous as coal. Fourteen coal samples of different ranks ranging from high to medium sulfur content were studied by dry oxidation tests at different temperatures and humidities, and by wet oxidation

tests using different oxidizing agents. The concentration of surface oxygen functional groups was determined by ion-exchange methods. The changes in the coal composition with oxidation were analyzed by spectroscopic techniques. The wettability of as-received and oxidized coal and coal pyrite samples was assessed by film flotation tests. The electrokinetic behavior of different coals and coal pyrite samples was studied by electrokinetic tests using electrophoresis. Possible oxidation mechanisms have been proposed to explain the changes on the coal surface induced by different oxidation treatments.

7145 (DOE/PC/91303–T13) **Semiconductor / electrochemistry of coal pyrite. Technical progress report, July–September, 1994.** Osseo-Asare, K.; Wei, D. Pennsylvania State Univ., University Park, PA (United States). Dept. of Materials Science and Engineering. Oct 1994. 15p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-91PC91303. Order Number DE95005182. Source: OSTI; NTIS; GPO Dep.

This project seeks to advance the fundamental understanding of the physicochemical processes occurring at the pyrite/aqueous interface, in the context of coal cleaning, coal desulfurization, and acid mine drainage. Pyrite particles were synthesized by aqueous precipitation and purified by means of solvent extraction to remove elemental sulfur. A purified pyrite sample containing 98.35% FeS_2 was obtained and used in photoelectrochemical experiments. Illumination of pyrite microelectrodes increased both the anodic current and the dissolution rate dramatically, but it had little effect on the cathodic current and the cathodic dissolution. These results indicate that pyrite, as an n-type semiconductor, dissolves anodically through a hole transfer pathway, while cathodic dissolution involves only electron reaction.

7146 (DOE/PC/92251–T7) **Refining of fossil resin flotation concentrate from western coal. Seventh quarter final report, July 1, 1994–September 30, 1994.** Jensen, G.F.; Miller, J.D. Utah Univ., Salt Lake City, UT (United States). 20 Oct 1994. 14p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-93PC92251. Order Number DE95006240. Source: OSTI; NTIS; GPO Dep.

The following equipment was purchased/fabricated to assemble the capacity of the resin-refining circuit: AccuRate dry material screw feeder, air operated feed pumps, solvent extractor, plastic tubings and fittings, unistrut fittings and valves, and nitrogen heater. Some equipment was tested and refining begun.

7147 (DOE/PC/93202–4) **Molecular accessibility in oxidized and dried coals. Quarterly report.** Kispert, L.D. Alabama Univ., University, AL (United States). Dept. of Chemistry. Sep 1994. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-93PC93202. Order Number DE95005200. Source: OSTI; NTIS; GPO Dep.

The objective of this research project is to determine the molecular and structural changes that occur in swelled coal as a result of oxidation and moisture loss both in the presence and absence of light using the newly developed EPR spin probe method. The proposed study will make it possible to deduce the molecular accessibility distribution in swelled, oxidized APCS coal for each rank as a function of (1) size (up to 6 nm) and shape, (2) the relative acidic/basic reactive site distributions, and (3) the role of hydrogen bonding as a function of swelling solvents. The advantage of the EPR method is that it permits molecules of selected shape, size and chemical reactivity to be used as probes of molecular accessible regions of swelled coal. From such data an optimum catalyst can be designed to convert oxidized coal into a more convenient form and methods can be devised to lessen the detrimental weathering processes. The observed data for the APCS coals studied to date can be explained in terms of four different processes: one, disruption of weak hydrogen bonds which protect or isolate the interconnected micropore system; two, disruption of weak hydrogen bonds which protect individual micropores; three, the competition of pyridine for the active sites capable of establishing hydrogen bonds or the poisoning of active sites; four, disruption of stronger hydrogen bonds within the macromolecular structure which cause an opening of the structure. The contributions of each of these factors to the spin probe retention with increasing concentrations of pyridine varying up to 5% pyridine are examined. At concentrations above 5% pyridine, the first factor becomes less significant, and variations in the others require greater changes in pyridine concentration.

7148 (DOE/PC/93223–T3) **Surface properties of photo-oxidized bituminous coals. Technical progress report, July–September, 1994.** Mitchell, G.; Zhang, E.; Subbarayan, S.; Davis, A.; Chander, S. Pennsylvania State Univ., University Park, PA (United States). Coal and Organic Petrology Labs. Nov 1994. 22p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-93PC93223. Order Number DE95005174. Source: OSTI; NTIS; GPO Dep.

Sample preparation on the coal samples collected during the last report period was slowed so that the authors could take advantage of some analytical opportunities. During this report period, sixteen solid-phase aromatic compounds were evaluated using the fluorometric techniques. In addition, samples of the Pittsburgh seam coal (DECS-23) were prepared and photo-oxidized in blue light for evaluation by Secondary Ion Mass Spectrometry (SIMS) at the University of New South Wales and by Scanning Transmission X-ray Microscopy (STXM) at Brookhaven National Laboratory. These analytical procedures should contribute to the understanding of the chemistry of fluorescence emission and its role in the photo-oxidation of coal (vitrinite) surfaces. Although results from the two outside laboratories are not available for the current report, the preliminary study of aromatic model compounds has been completed. Compared with vitrinite, fluorescence emissions from most of the model compounds were considerably higher. The reason for this was found in the evaluation of compounds with different numbers of condensed aromatic rings and molecular configuration, as well as the type and location with the molecule of heteroatoms and substituents. However, of most importance to this study was the observation that compounds containing carbonyl and carboxylic acid groups possessed relatively high fluorescence emissions and gave positive or dual alteration patterns in response to photo-oxidation. This observation has similarities to results obtained from low-rank and naturally weathered coals which also contain these functional groups.

7149 (DOE/PC/94214–T1) **Organosulphur compounds in coals as determined by reaction with Raney nickel and microscale pyrolysis techniques. First quarterly report, July 1, 1994–September 30, 1994.** Philp, R.P. Oklahoma Univ., Norman, OK (United States). School of Geology and Geophysics. [1994]. 3p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-94PC94214. Order Number DE95006241. Source: OSTI; NTIS; GPO Dep.

This project is designed to study the nature of sulphur-containing organic compounds and their respective linkages in coals and related materials using a variety of microscale pyrolysis techniques combined with gas chromatography, gas chromatography – mass spectrometry, and gas chromatography – mass spectrometry/mass spectrometry. The majority of the work will be undertaken using a PYRAN pyrolysis system purchased with funds from the DOE University Instrumentation Program. Although significant studies in the past have examined hydrocarbons produced from the pyrolysis of coals, little attention has been directed at studying the heteroatomic components produced in this way. With the use of carefully controlled temperature-programmed pyrolysis reactions it should be possible to obtain information on the relative bond energies of the C-S and S-S bonds being cleaved during coal pyrolysis and to provide a better understanding on the nature of the sulphur bonding in coals. In the experiments performed with Raney nickel and coal, the results showed that while Raney nickel was indeed and excellent degrader of organic sulphur compounds in oils and coal extracts, the recovery from a high sulphur Oklahoman coal was negligible. Following the realization that Raney nickel is of little use in cleaving organosulphur compounds from coals, a new literature review was initiated to determine which possible sulphur chemical degradation method would be an appropriate replacement. After careful consideration of the various possible methods, it would appear that the procedure which will work on solid phases (i.e., coal), will give similar results to the Raney nickel method, and which we may be able to perform here with the least level of expenditure on

new equipment, is the use of nickel(O)cene (bis[1,5-cyclopentadiene]nickel(O)) with lithium aluminum hydride ($LiAlH_4$).

7150 (FAAR–23/1993, pp. 125-130) **Electrostatic precipitator penetration function for pulverised coal combustion aerosols at different boiler loadings.** Ylaetalo, S.I. (Technical Research Centre of Finland, Espoo (Finland). Aerosol Technology Group); Kauppinen, E.I.; Joutsensaari, J.; Jokiniemi, J.K.; Hautanen, J. Finnish Association for Aerosol Research, Espoo (Finland). 1993. (CONF-9306401–: 5. Finnish national aerosol symposium, Espoo (Finland), 1-3 Jun 1993). In *Report series in aerosol science.* 292p. Order Number DE95737628. Source: OSTI; NTIS.

The penetration of fly ash particles through the electrostatic precipitator (ESP) was measured as a function of particle diameter in the size range of 0.02-0.7 μm at a 300 MW boiler during different operating conditions for combustion and electrostatic precipitation by differential mobility analysers (DMA) and condensation nucleus counters (CNC). Gas composition (O_2, CO_2, CO, NO_x and SO_2) and ESP operating voltages and currents were recorded. Measured mobility distributions were inverted to the desired number size distributions by a commercial TSI-algorithm. Fractional penetration functions were calculated as the ratio of number size distributions before and after the ESP, respectively. Penetration functions appeared to depend on the boiler load, ESP voltages and the operation of coal mill. Highest penetration was achieved with the highest boiler load. Bimodal structure of the penetration function was detected when the last section of ESP was mall functioning or turned off. (orig.)

0108 Waste Management

Refer also to citation(s) 7098, 7171, 7174, 7178, 7633, 7635, 7636, 8181, 8436, 8437

7151 (DOE/MC/22118–3865) **Field study of circulating fluidized-bed ash. Final report, April 1986–October 1994.** Weinberg, A. (Radian Corp., Austin, TX (United States)); Coel, B.J.; Butler, R.D. Radian Corp., Austin, TX (United States); North Dakota Univ., Grand Forks, ND (United States). Energy and Environmental Research Center. Aug 1994. 313p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC21-86MC22118. Order Number DE94012289. Source: OSTI; NTIS; GPO Dep.

This report presents the results of a three-year program of field testing at an Fluidized-bed combustion (FBC) waste disposal site constructed in western Colorado with the cooperation of the Tri-State Generation and Transmission Association's Nucla power station. Data were collected to characterize: (1) the wastes; (2) the envirorunents in which they were disposed of; and (3) the leaching, migration, and attenuation of regulated or potentially regulated constituents. Data gathered during this study will serve as the basis for an engineering design manual to guide future disposal facility development.

7152 (DOE/MC/26288–3961) **Sonic enhanced ash agglomeration and sulfur capture. Technical progress report, July 1994–September 1994.** Manufacturing and Technology Conversion International, Inc., Santa Fe Springs, CA (United States). [1994]. 33p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC21-89MC26288. Order Number DE95006092. Source: OSTI; NTIS; GPO Dep.

A major concern with the utilization of coal in directly fired gas turbines is the control of particulate emissions and reduction of sulfur dioxide, and alkali vapor from combustion of coal, upstream of the gas turbine. Much research and development has been sponsored on methods for particulate emissions control and the direct injection of calcium-based sorbents to reduce SO_2 emission levels. The results of this research and development indicate that both acoustic agglomeration of particulates and direct injection of sorbents have the potential to become a significant emissions control strategy.

7153 (DOE/MC/30252–3945) **Management of dry flue gas desulfurization by-products in underground mines. Annual report, October 1993–September 1994.** Chugh, Y.P.; Dutta, D.; Esling, S.; Ghafoori, N.; Paul, B.; Sevim, H.; Thomasson, E. Southern Illinois Univ., Carbondale, IL (United States). Dept. of Mining Engineering. Oct 1994. 138p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FC21-93MC30252. Order Number DE95000035. Source: OSTI; NTIS; GPO Dep.

Preliminary environmental risk assessment on the FGD by-products to be placed underground is virtually complete. The initial mixes for pneumatic and hydraulic placement have been selected and are being subject to TCLP, ASTM, and modified SLP shake tests as well as ASTM column leaching. Results of these analyses show that the individual coal combustion residues, and the residues mixes, are non-hazardous in character. Based on available information, including well logs obtained from Peabody Coal Company, a detailed study of the geology of the placement site was completed. The study shows that the disposal site in the abandoned underground mine workings at depths of between 325 and 375 feet are well below potable groundwater resources. This, coupled with the benign nature of the residues and residues mixtures, should alleviate any concern that the underground placement will have adverse effects on groundwater resources. Seven convergence stations were installed in the proposed underground placement area of the Peabody Coal Company No. 10 mine. Several sets of convergence data were obtained from the stations. A study of materials handling and transportation of coal combustion residues from the electric power plant to the injection site has been made. The study evaluated the economics of the transportation of coal combustion residues by pneumatic trucks, by pressure differential rail cars, and by SEEC, Inc. collapsible intermodal containers (CICs) for different annual handling rates and transport distances. The preliminary physico-chemical characteristics and engineering properties of various FBC fly ash-spent bed mixes have been determined, and long-term studies of these properties are continuing.

7154 (DOE/MT/92018–8) **Investigation of combined SO_2/NO_x removal by Ceria sorbents. Quarterly technical progress report, July 1994–September 1994.** Akyurtlu, A. Hampton Univ., VA (United States). Dept. of Engineering. Oct 1994. 23p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-92MT92018. Order Number DE95005374. Source: OSTI; NTIS; GPO Dep.

Simultaneous removal of SO_2 and NO_x using a regenerable solid sorbent will constitute an important improvement over the use of separate processes for the removal of these two pollutants from stack gases and possibly eliminate several shortcomings of the individual SO_2 and NO_xremoval operations. This process will allow simple and reliable cleanup of large volumes of stack gases at a competitive cost; produce a concentrated stream of SO_2 which an easily be converted into valuable by-products; be compatible with existing power generation plants; and essentially eliminate the waste materials generated in some other sulfur removal processes. Recent studies at PETC considered cerium oxide as an alternate sorbent to CuO. Ceria improves the resistance of the alumina support to thermal sintering and produces a regeneration off-gas stream that can be easily converted to elemental sulfur. It has a potentially higher sulfur capture capacity than copper. It is readily available at a moderate cost. Although it is more expensive than copper oxide, since the cost of metal oxide is a small fraction of the total sorbent cost this may not be a significant factor. The objective of this research is to determine the effects of ammonia on the sulfation of the sorbent; to determine the effects of fly ash on the sulfation and regeneration of the sorbent; to obtain a rate expression for the regeneration of alumina-supported CeO_2 sorbents; to model reactor configurations for a commercial scale combined CeO_2/Al_2O_3 sorbent; and to study alternative designs, effects of design variables on the performance of the facility, and the economics of the process using the developed model.

7155 (DOE/PC/90096–T7) **Microbial reduction of SO_2 and NO_x as a means of by-product recovery/disposal from regenerable processes for the desulfurization of flue gas. Technical progress report, September 11, 1992–December 11, 1992.** Sublette, K.L. Tulsa Univ., OK (United States). Center for Environmental Research and Technology. [1992]. 250p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-90PC90096. Order Number DE94012353. Source: OSTI; NTIS; GPO Dep.

With the continual increase in the utilization of high sulfur and high nitrogen containing fossil fuels, the release of airborne pollutants into the environment has become a critical problem. The fuel sulfur is converted to SO_2 during combustion. Fuel nitrogen and a fraction of the nitrogen from the combustion air are converted to nitric oxide and nitrogen dioxide, NO_x. For the past five years Combustion Engineering (now Asea Brown Boveri or ABB) and, since 1986, the University of Tulsa (TU) have been investigating the oxidation of H_2S by the facultatively anaerobic and autotrophic bacterium Thiobacillus denitrificans and have developed a process, concept for the microbial removal of H_2S from a gas stream the simultaneous removal of SO_2 and NO by D. desulfuricans and T. denitrificans co-cultures and cultures-in-series was demonstrated. These systems could not be sustained due to NO inhibition of D. desulfuricans. However, a preliminary economic analysis has shown that microbial reduction of SO_2 to H_2S with subsequent conversion to elemental sulfur by the Claus process is both technically and economically feasible if a less expensive carbon and/or energy source can be found. It has also been demonstrated that T. denitrificans can be grown anaerobically on NO(g) as a terminal electron acceptor with reduction to elemental nitrogen. Microbial reduction of NO_x is a viable process concept for the disposal of concentrated streams of NO_x as may be produced by certain regenerable processes for the removal of SO_2 and NO_x from flue gas.

7156 (DOE/PC/90365–T16) **Fundamental mechanisms in flue gas conditioning. Quarterly report, July 1994–September 1994.** Snyder, T.R. Southern Research Inst., Birmingham, AL (United States). 15 Oct 1994. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-91PC90365. Order Number DE95005766. Source: OSTI; NTIS; GPO Dep.

This project is divided into four tasks. We developed our Management Plan in Task 1 . Task 2, Evaluation of Mechanisms in FGD Sorbent and Ash Interactions, focuses on characteristics of binary mixtures of these distinct powders. Task 3, Evaluation of Mechanisms in Conditioning Agents and Ash, is designed to examine effects of various conditioning agents on fine ash particles to determine mechanisms by which these agents alter physical properties of ash. We began Tasks 2 and 3 with an extensive literature search and assembly of existing theories. We completed this phase of the project with publication of two special Topical Reports. During the past several quarters we performed our analyses of the samples in our database. Pilot-scale evaluations have begun and will continue during the next two quarters. We will include the results of laboratory and pilot-scale work performed under Tasks 2 and 3 in a Flue Gas Conditioning Model that we will issue under Task 4. The Final Report for the project will also be prepared under Task 4. In our literature reviews reported in Topical Reports 1 and 2, we emphasized the roles adsorbed water can have in controlling bulk properties of powders. The experiments we performed were primarily designed to define the extent to which water affects key properties of ashes, powders, and mixtures of sorbents and ashes. We are currently performing a series of pilot-scale tests designed to determine the effects that adsorbed water has on fabric filtration and electrostatic precipitation of entrained fly ash particles in actual flue gas environments.

7157 (DOE/PC/90548–T14) **LIFAC Sorbent Injection Desulfurization Demonstration Project. Quarterly report No. 15, April–June 1994.** LIFAC North America, Inc., Oakland, CA (United States). [1995]. 24p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FC22-91PC90548. Order Number DE95005522. Source: OSTI; NTIS; GPO Dep.

In December 1989, the U.S. Department of Energy selected 13 projects for funding under the Federal Clean Coal Technology Program (Round III). One of the projects selected was the project sponsored by LIFAC North America, (LIFAC NA), titled "LIFAC Sorbent Injection Desulfurization Demonstration Project". The host site for this $22 million, three-phase project is Richmond Power and Light's Whitewater Valley Unit No. 2 in Richmond, Indiana. The LIFAC technology uses upper-furnace limestone injection with patented humidification of the flue gas to remove 75-85% of the sulfur dioxide (SO_2) in the flue gas. In November 1990, after a ten (10) month negotiation period, LIFAC NA and the U.S. DOE entered into a Cooperative Agreement for the design, construction, and demonstration of the LIFAC system. This report is the fifteenth Technical Progress Report covering the period April 1, 1994 through the end of June 1994. Due to the power plant's planned outage in March 1991, and the time needed for engineering, design and procurement of critical equipment, DOE and LIFAC NA agreed to execute the Design Phase of the project in August 1990, with DOE funding contingent upon final signing of the Cooperative Agreement.

7158 (DOE/PC/90548–T15) **LIFAC Sorbent Injection Desulfurization Demonstration Project. Quarterly Report No. 16, July-September 1994.** LIFAC North America, Inc., Oakland, CA (United States). [1995]. 23p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FC22-91PC90548. Order Number DE95005523. Source: OSTI; NTIS; GPO Dep.

In December 1989, the U.S. Department of Energy selected 13 projects for funding under the Federal Clean Coal Technology Program (Round III). One of the projects selected was the project sponsored by LIFAC North America, (LIFAC NA), titled "LIFAC Sorbent Injection Desulfurization Demonstration Project". The host site for this $22 million, three-phase project is Richmond Power and Light's Whitewater Valley Unit No. 2 in Richmond, Indiana. The LIFAC technology uses upper-furnace limestone injection with patented humidification of the flue gas to remove 75-85% of the sulfur dioxide (SO_2) in the flue gas. In November 1990, after a ten (10) month negotiation period, LIFAC NA and the U.S. DOE entered into a Cooperative Agreement for the design, construction, and demonstration of the LIFAC system. This report is the sixteenth Technical Progress Report covering the period July 1, 1994 through the end of September 1994. Due to the power plant's planned outage in March 1991, and the time needed for engineering, design and procurement of critical equipment, DOE and LIFAC NA agreed to execute the Design Phase of the project in August 1990, with DOE funding contingent upon final signing of the Cooperative Agreement.

7159 (DOE/PC/93256–T4) **Electric Power Research Institute: Environmental Control Technology report to the Steering Committee, July 1994. [Monthly report].** Electric Power Research Inst., Palo Alto, CA (United States). [1994]. 70p. Sponsored by USDOE, Washington, DC (United States);Electric Power Research Inst., Palo Alto, CA (United States). DOE Contract FG22-94PC93256. Order Number DE95005562. Source: OSTI; NTIS; GPO Dep.

Operations and maintenance continued this month at the Electric Power Research Institute's Environmental Control Technology Center. Testing on the 4.0 MW Pilot Wet FGD unit continued this month with the completion of the Tampa Electric Company (TECo) Tailored Collaboration project and resumption of the High Velocity Scrubbing test block. Additional testing in Phase II of the Toxics Removal/Carbon Injection test block was conducted concurrently with the Pilot FGD testing. On the Cold-Side Selective Catalytic Reduction (SCR) unit, testing continued this month as ammonia slip measurements were conducted at baseline conditions. A layer of catalyst material was removed from one side of the unit this month; it will be replaced with a new catalyst layer during a scheduled outage period in September.

7160 (DOE/PC/93256–T5) **Electric Power Research Institute: Environmental Control Technology Center report to the Steering Committee, August 1994. [Monthly report].** Electric Power Research Inst., Palo Alto, CA (United States). [1994]. 127p. Sponsored by USDOE, Washington, DC (United States);Electric Power Research Inst., Palo Alto, CA (United States). DOE Contract FG22-94PC93256. Order Number DE95005563. Source: OSTI; NTIS; GPO Dep.

Operations and maintenance continued this month at the Electric Power Research Institute's Environmental Control Technology Center. Testing on the 4.0 MW Pilot Wet FGD unit continued this month with the High Velocity Scrubbing test block. Additional testing in Phase II of the Toxics Removal/Carbon Injection test block was conducted concurrently with the Pilot FGD testing. On the Cold-Side Selective Catalytic Reduction (SCR) unit, testing continued this month as ammonia slip measurements were conducted at baseline and low temperature conditions.

0109 Environmental Aspects

Refer also to citation(s) 7637

7161 (PINSTECH-RIAD–136) **Isotopic and chemical characterization of coal in Pakistan.** Qureshi, R.M. (Pakistan Inst. of Nuclear Science and Technology, Islamabad (Pakistan). Radiation and Isotope Application Div.); Hasany, S.M.; Javed, T.; Sajjad, M.I.; Shah, Z.; Rehman, H. Pakistan Inst. of Nuclear Science and Technology, Islamabad (Pakistan). Radiation and Isotope Application Div. Nov 1993. 23p. Order Number DE95615651. Source: OSTI; NTIS (US Sales Only); INIS.

Stable carbon isotope ratios (delta^{13}C PDB) and toxic/trace element concentration levels are determined for Tertiary coal samples collected from seven coal fields in Pakistan. No systematic isotope effects are found in the process of coal liquefaction from peat to Tertiary lignites and sub bituminous coal. Similarly, no age effects are observed during the Tertiary regime. The observed variations in the carbon isotopic composition of coal obtained from 'Sharigh coal field' and the 'Sor-Range/Degari coal field' in Baluchistan are attributed to the depositional environments. More sampling of stable carbon isotope analysis are required to validate these observations. Significant concentrations of toxic elements such as S, Cr, Cd and Pb in Makarwal coal may pose environmental and engineering/operational problems for thermal power plants. (author).

0120 Mining

Refer also to citation(s) 7541

7162 (ETDE-DE–5) **Joint-project transport control system. Sub-project: Set-up of a material flow control with integration into the district control center's infrastructure. Final report.** Hagen, G.; Melzer, H. Ruhrkohle AG, Essen (Germany). Sep 1994. 104p. Sponsored by Bundesministerium fuer Forschung und Technologie, Bonn (Germany). Foerderkennzeichen BMFT 0326645H. Order Number DE95738150. Source: OSTI; NTIS (US Sales Only).

Within the project, a transport control system was developed. The system was to monitor by 100% the material transport in the underground workings, and assure computer-controlled transport, for optimising transport management, for monitoring the rolling stock in terms of state and availability, and for allowing state-oriented maintenance of the rolling stock. For vehicle-position monitoring, a stationary laser scanner was developed. The almost 100% position monitoring is the basis for comprehensive and correct information flow and for computer-based transport management, also developed within the project. An absolutely necessary component of the transport control system is the newly developed voice and data radio communication allowing rapid data transmission as well as transport-relevant information transmission directly and to the correct adress from the control center. A machine-health monitoring system (diagnostics) monitors diesel-powered rolling stock during travel, and supports maintenance by allowing computer-based machine-health diagnostics to the maintenance staff. The concept also provides for a data exchange with the maintenance planning system allowing change-over from the periodicel preventive maintenance and repair planning to need-oriented maintenance. (orig.)

7163 (ETDE-DE–6) **Automation in mining - sensor for position monitoring. Mining requirements, machine integration, testing. Final report.** Dahlhaus, N. Ruhrkohle Bergbau AG, Herne (Germany). Aug 1994. 68p. (In German). Sponsored by Bundesministerium fuer Forschung und Technologie, Bonn (Germany). Foerderkennzeichen BMFT 0328901E. Order Number DE95738700. Source: OSTI; NTIS (US Sales Only).

For further development and automation of mining machinery and equipment it is necessary in many cases to have information on the position of a machine or a part of a machine relative to its surroundings or relative to the north. In the joint project 'Sensor for Position Monitoring' two-axial and three-axial position identification systems of different measuring exactitude were developed. The sensor may be, for various application cases, the bases for cost-effective automation. This work in view of fielding needs to be taken on in the near future by the mine operators and the suppliers of mining equipment. (orig.)

7164 (ETDE-DE–7) **Development and testing of new methods for prevention and suppression of spontaneous combustion fires in coal mining. Final report.** Guntau, A.; Hein, N. Ruhrkohle AG, Herne (Germany). Sep 1994. 78p. Sponsored by Bundesministerium fuer Forschung und Technologie, Bonn (Germany). Foerderkennzeichen BMFT 01HD018. Order Number DE95738149. Source: OSTI; NTIS (US Sales Only).

Spontaneous combustion in coal mining always used to be a risk to the underground crews and to profitability. There is not full understanding yet of the physico-chemical interactions resulting in spontaneous combustion of coal so that for the field, reliable forecasts cannot be made. The results of this R+D project comprises four contributions to a solution complex problem: - A filed survey of preventive measures against spontaneous combustion in current operation yielded updated and quantifiable instructions for preventing spontaneous combustion within the framework of future planning. - The results of a newly developed laboratory method for determination of the coal's proneness to spontaneous combustion, on the basis of non-isothermal pyrolysis kinetics were well congruent with available data from the mine fire statistics of the past 20 years. - Analysis and assessment of tracer gases (in particular CO, H_2, C_2H_4) of spontaneous combustion processes underground allow an estimate of the temperatures prevailing in a given location of a fire. - The prototype of a novel measuring unit allows rapid spotting of mine fires in the caved-in goafs, and thus optimisation of nitrogen application for firelighting. (orig.)

7165 (INIS-mf–15080) **Coal mining situation in the Federal Republic of Germany. First half-year 1994.** Statistik der Kohlenwirtschaft e.V., Essen (Germany). 31 Aug 1994. 15p. (In German). Order Number DE95738585. Source: OSTI; NTIS (US Sales Only); INIS.

The report provides up-to-date information on the German coal mining industry for the reporting time period. Data on coal mining as well as on brown coal mining cover: Production, stocks, productivity, employes, sales, imports and exports of coal and coal products. (orig.)

0130 Transport, Handling, and Storage

Refer also to citation(s) 7188

7166 (DOE/PC/90314–T9) **Hydrocarbon-oil encapsulated air bubble flotation of fine coal. Technical progress report for the fifth quarter, October 1, 1991–December 30, 1991.** Peng, F.F. West Virginia Univ., Morgantown, WV (United States). [1995]. 60p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-90PC90314. Order Number DE95005511. Source: OSTI; NTIS; GPO Dep.

A main portion of this reporting period has been consumed in the following tasks: (i) Contact angle measurement using gasified collector encapsulated bubble; (ii) wettability measurement using film flotation method; (iii) induction time measurement; (iv) conducting atomized collector flotation tests in a stirred tank cell; (v) developing the experimental design and conducting a column flotation test. The coal samples used in this period of work are five ranks of coal samples from Mammoth, Lower Kittanning, Upper Freeport, Pittsburgh No. 8 and Wyodak seam coals. To better understand the fundamental steps involved in the modes of collector addition techniques in the froth flotation, contact angle, wettability and induction time were measurement. It was found increasing in the contact angles and decreasing in the induction time for a hydrocarbon-oil encapsulated air bubble compared to those for an oil-free bubble for all the coal samples measured. These observations may account for the improved flotation kinetics and, hence, the recovery with the hydrocarbon-oil encapsulated bubbles. Two level fractional factorial experimental design were developed for conducting the column flotation tests to obtain the optimal operating conditions. In the first series of the tests, seven operating parameters were considered with 16 runs. Based on those results, subsequently, the second experimental design was developed for six operating parameters with 16 runs. The third experiment design was formulated with three most significant operating parameters with 8 runs. A high combustible recovery was obtained for -200 mesh Upper Freeport coal sample. However, the results indicated

that for further reduction of the ash content of the froth product, the height of column flotation cell needed to be increased.

0140 Combustion

Refer also to citation(s) 7101, 7141, 7143, 7150, 7152, 7633, 7841, 8140, 8167, 8437, 8439

7167 (DOE/EA–0575) **Fundamental Fluidization Research Project. Environmental Assessment.** USDOE Morgantown Energy Technology Center, WV (United States). Jan 1994. 18p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95002669. Source: OSTI; NTIS; GPO Dep.

Morgantown Energy Technology Center proposes to conduct fundamental research on fluidization technology by designing, constructing, and operating a 2-foot diameter, 50-foot high, pressurized fluidized-bed unit. The anticipated result of the proposed project would be a better, understanding of fluidization phenomena under pressurized and high velocity conditions. This improved understanding would, provide a sound basis for design and scale-up of pressurized circulating fluidized-bed combustion (PCFBC) processes for fossil energy applications. Based on the analysis in the EA, DOE has determined that the proposed action is not a major, Federal action significantly affecting the quality of the human environment, within the meaning of the National Environmental Policy Act (NEPA) of 1969. Therefore, the preparation of an Environmental Impact Statement is not required and the Department is issuing this FONSI.

7168 (DOE/MC/27205–3964) **AFBC co-firing of coal and hospital waste. Quarterly progress report, August 1, 1994–October 31, 1994.** Stuart, J.M. Donlee Technologies, Inc., York, PA (United States). 31 Jan 1995. 19p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FC21-91MC27205. Order Number DE95006154. Source: OSTI; NTIS; GPO Dep.

The project objective is to design, construct, install, operator training and start-up a circulating fluidized bed combustion system at the Lebanon Pennsylvania Veteran's Affairs Medical Center. This unit will co-fire coal and hospital waste providing inexpensive and efficient destruction of both general and infectious hospital waste and steam generation. The steam generated is as follows: The State permitting process required for construction is completed. Operating permits will be obtained after construction has been completed. Construction and equipment fabrication continues. The purchase of the equipment from vendors continues. The installation of the equipment at site started August 15, 1994. The piping began during October and continues.

7169 (DOE/MC/27362–3860) **Blast furnace granular coal injection project. Annual report, January–December 1993.** Bethlehem Steel Corp., PA (United States). Jun 1994. 32p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FC21-91MC27362. Order Number DE94012286. Source: OSTI; NTIS; GPO Dep.

This initial annual report describes the Blast Furnace Granular Coal Injection project being implemented at Bethlehem Steel Corporation's (BSC) Burns Harbor, Indiana, plant. This installation will be the first in the United States to employ British Steel technology that uses granular coal to provide part of the fuel requirement of blast furnaces. The project will demonstrate/assess a broad range of technical/economic issues associated with the use of coal for this purpose. These include: coal grind size, coal injection rate, coal source (type) and blast furnace conversion method. Preliminary Design (Phase 1) began in 1991 with detailed design commencing in 1993. Construction at Burns Harbor (Phase 2) began in August 1993. Construction is expected to complete in the first quarter of 1995 which will be followed by the demonstration test program (Phase 3). Progress is described.

7170 (DOE/PC/89774–T11) **Modeling of single char combustion, including CO oxidation in its boundary layer.** Lee, C.H.; Longwell, J.P.; Sarofim, A.F. Massachusetts Inst. of Tech., Cambridge, MA (United States). 25 Oct 1994. 190p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-89PC89774. Order Number DE95005557. Source: OSTI; NTIS; GPO Dep.

The combustion of a char particle can be divided into a transient phase where its temperature increases as it is heated by oxidation, and heat transfer from the surrounding gas to an approximately constant temperature stage where gas phase reaction is important and which consumes most of the carbon and an extinction stage caused by carbon burnout. In this work, separate models were developed for the transient heating where gas phase reactions were unimportant and for the steady temperature stage where gas phase reactions were treated in detail. The transient char combustion model incorporates intrinsic char surface production of CO and CO_2, internal pore diffusion and external mass and heat transfer. The model provides useful information for particle ignition, burning temperature profile, combustion time, and carbon consumption rate. A gas phase reaction model incorporating the full set of 28 elementary C/H/O reactions was developed. This model calculated the gas phase CO oxidation reaction in the boundary layer at particle temperatures of 1250 K and 2500 K by using the carbon consumption rate and the burning temperature at the pseudo-steady state calculated from the temperature profile model but the transient heating was not included. This gas phase model can predict the gas species, and the temperature distributions in the boundary layer, the CO_2/CO ratio, and the location of CO oxidation. A mechanistic heat and mass transfer model was added to the temperature profile model to predict combustion behavior in a fluidized bed. These models were applied to data from the fluidized combustion of Newlands coal char particles. 52 refs., 60 figs.

7171 (DOE/PC/89805–T9) **Cross-flow, filter-sorbent-catalyst for particulate, SO_2 and NO_x control. Final report.** Benedek, K. (Little (Arthur D.), Inc., Cambridge, MA (United States)); Flytzani-Stephanopoulos, M. Little (Arthur D.), Inc., Cambridge, MA (United States). May 1994. 119p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-89PC89805. Order Number DE95001934. Source: OSTI; NTIS; GPO Dep.

This report describes work performed on a new concept for integrated pollutant control: An active filter comprised of layered, gas permeable membranes that act as a particle filter, an SO_2 sorbent, and a NO_x, reduction catalyst. The focus of the research program documented in this final report is the development of the sorbent/catalyst materials that are the basis of such an emission control system. The device investigated in this program will simultaneously remove particulates, SO_2 and NO_x, from combustion exhaust gases. Sulfur dioxide capture and nitrogen oxide reduction are achieved with a reg le, mixed-metal oxide sorbent-catalyst. The device is a filter with layered walls: A small-pore layer is a barrier to particles, and a macroporus active layer is a SO_2 sorbent and a catalyst for the selective catalytic reduction of NO_x. The small-pore layer could be an inert ceramic that provides structural strength to the unit and protects the active (sorbent-catalyst) material from abrasion or contamination from fly ash particles. We have found that 95–100% removal efficiency of SO_2 and 60–90% removal of NO_x, is achievable with the use of mixed-metal oxide sorbent-catalysts in the device. The ceramic filters are barriers to particles and typically have removal efficiencies of 99.9%.

7172 (DOE/PC/91161–T9) **A coal-fired combustion system for industrial process heating applications. Quarterly technical progress report, April 1994–June 1994.** Vortec Corp., Collegeville, PA (United States). 30 Jul 1994. 32p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-91PC91161. Order Number DE95004313. Source: OSTI; NTIS; GPO Dep.

This advanced combustion system research program is for the development of innovative coal-fired process heaters which can be used for high temperature melting, smelting and waste vitrification processes. The process heater systems to be developed have multiple use applications; however, the Phase III research effort is being focused on the development of a process heater system to be used for producing value added vitrified glass products from boiler/incinerator ashes and industrial wastes. The primary objective of the Phase III project is to develop and integrate all the system components, from fuel through total system controls, and then test the complete system in order to evaluate its potential

marketability. During the past quarter, the major effort was concentrated on completing the modifications to the test facility and completing a Test Plan for the long duration testing. The system modifications included the installation and shakedown testing of the new coal storage and feeding system, modifications to the existing batch handling system, and integration of a single wheel mineral wool fiberizer. All of the modifications required to conduct 100 hrs of continuous testing have now been completed. The test program will consist of one test run, with a duration of 100 hours at a nominal feed rate of 1000 lbs/hr. Throughout the test, the CMS will be fired with coal and a coal by-product (i.e. coal-fired boiler flyash) as the primary fuels. Natural gas will be used as an auxiliary fuel as necessary to provide process trim. The feedstock will consist of a coal-fired utility boiler flyash and any glass forming agents required to produce a stable, fully-reacted vitrified product. The fly ash, supplied by PENELEC, contains between 6 and 12% by weight of carbon because of the low NOx burners on the PENELEC boilers. Therefore, a substantial portion of the required thermal input will come from the fly ash.

7173 (DOE/PC/91308–12) **Particulate behavior in a controlled-profile pulverized coal-fired reactor: A study of coupled turbulent particle dispersion and thermal radiation transport. Quarterly technical progress report, June 15–September 14, 1994.** Queiroz, M.; Webb, B.W. Brigham Young Univ., Provo, UT (United States). [1994]. 16p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-91PC91308. Order Number DE95005198. Source: OSTI; NTIS; GPO Dep.

Improved understanding of the fundamental processes involved in pulverized-coal combustion is needed to make the energy extraction more efficient and the combustion byproducts environmentally safe. This proposal seeks to characterize the local particulate concentration, velocity, and size distribution in a well-controlled, parametrically-varied laboratory-scale reactor using a new laser diagnostic technique. This newly-developed technique is the only one currently available for the investigation of aspherical particles. The particulate data will be collected simultaneously with local gas temperature and wall radiant heat flux distributions. Although the study proposed here is primarily designed to provide experimental data not currently available for the evaluation of turbulent particle dispersion and radiation models, comparisons of analytical predictions and the experimental data obtained will be performed, using appropriate submodels integral to comprehensive pulverized-coal combustion codes existent at Brigham Young University. During the twelfth quarter progress has been made in the following areas: (1) reduction of experimental data recently collected; and (2) particle dispersion modeling. This report summarizes findings from these two areas.

7174 (DOE/PC/92159–T9) **Air toxics evaluation of ABB Combustion Engineering Low-Emission Boiler Systems.** Wesnor, J.D. (ABB/Combustion Engineering, Inc., Windsor, CT (United States)). ABB/Combustion Engineering, Inc., Windsor, CT (United States); Energy and Environmental Research Corp., Irvine, CA (United States). 26 Oct 1993. 212p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-92PC92159. Order Number DE95002579. Source: OSTI; NTIS; GPO Dep.

The specific goals of the program are to identify air toxic compounds that might be emmitted from the new boiler with its various Air Pollution Control device for APCD alternatives in levels of regulatory concern. For the compounds thought to be of concern, potential air toxic control methodologies will be suggested and a Test Protocol will be written to be used in the Proof of Concept and full scale tests. The following task was defined: Define Replations and Standards; Identify Air Toxic Pollutants of Interest to Interest to Utility Boilers; Assesment of Air Toxic By-Products; State of the Art Assessment of Toxic By-Product Control Technologies; and Test Protocol Definition.

7175 (DOE/PC/92190–T6) **Fundamental study of ash formation and deposition: Effect of reducing stoichiometry. Quarterly report No. 6, 1 July–30 September 1994.** Helble, J.J. (Physical Sciences, Inc., Andover, MA (United States)); Bool, L.E.; Huffman, G.P.; Huggins, F.E.; Shah, N.; Peterson, T.W.; Gallien, D.; Sarofim, A.F.; Zeng, Taofang,. Physical Sciences, Inc., Andover, MA (United States). Nov 1994. 54p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-93PC92190. Order Number DE95006206. Source: OSTI; NTIS; GPO Dep.

The work discussed in highlights the accomplishments of the sixth quarter of this two year project. This includes University of Kentucky Moessbauer and computer controlled scanning electron microscopy (CCSEM) analysis of combustion ash samples generated by MIT and PSI Technologies (PSIT); a discussion of the MIT test results; a discussion of the University of Arizona's ongoing efforts in drop tube reactor combustion testing; and additional analysis of ash deposition data by PSIT. Recently completed University of Kentucky analyses of combustion ash samples are presented. Specifically, Moessbauer analysis of a size graded sample of beneficiated Pittsburgh No. 8 coal was compared with the same analysis performed on a utility grind sample. A much lower percentage of sulfate was found in the size graded, <75 μm sample prepared by MIT than in the utility grind sample studied by PSIT. Moessbauer analysis of ash samples generated from combustion of this size-graded coal at MIT demonstrated increasing iron-containing glass formation with increasing oxygen partial pressure. CCSEM analyses of the Silverdale coal (United Kingdom, bituminous) and ash samples derived from this coal in combustion testing at PSIT are also presented. Iron aluminosilicate formation was observed for these samples.

7176 (DOE/PC/92528–7) **Char particle fragmentation and its effect on unburned carbon during pulverized coal combustion. Quarterly report, April 1–June 30, 1994.** Diaz, R.; Mitchell, R.E. Stanford Univ., CA (United States). High Temperature Gasdynamics Lab. Oct 1994. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-92PC92528. Order Number DE95005203. Source: OSTI; NTIS; GPO Dep.

The knowledge obtained during the course of this project will be used to predict accurately the overall mass loss rates of coals based on the mineral content and porosity of their chars. The work will provide a means of assessing reasons for unburned carbon in the ash of coal fired boilers and furnaces. During this quarter, the particle population model, discussed in the previous quarterly, was used to characterize the fragmentation observed during extraction of char samples from the laminar flow reactor. Because present measurements of the particle distribution were performed with a single orifice tube with a lower particle size limit of about 5 μm, curve fits to the measured size distributions were used to estimate the number of particles below about 5 μm. These estimates were then used with the model in the characterizations. Using the particle population model, the authors determined that about 0.1% of the particles placed in the particle feeder produced small fragments during the particle extraction and collection on filter paper. The fragmentation was characterized as attrition, where small fragments are shed from the particle periphery leaving the sizes of particles almost unchanged, (and hence leaving the number of particles in the larger size fractions essentially the same). Based on these results, the authors feel confident that char fragmentation associated with burning can be distinguished from char fragmentation associated with the sampling process. During burning, the dominant mode of fragmentation is likely to be characterized as breakage, where the number of particles in the larger size fractions decreases as fragmentation progresses.

7177 (DOE/PC/93221–T4) **Combustion of pulverized coal in vortex structures. Quarterly progress report number 4, July 1–September 30, 1994.** Gollahalli, S.R. Oklahoma Univ., Norman, OK (United States). School of Aerospace and Mechanical Engineering. Oct 1994. 16p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-93PC93221. Order Number DE95005183. Source: OSTI; NTIS; GPO Dep.

The overall objectives of the project are: (1) to investigate the changes in the characteristics of large scale vortex structures in the shear layer caused by the introduction of inert solid particles in one of the feed streams; (2) to understand the effects of pyrolyzing solids on the shear layer behavior; (3) to study the effect of combustion of the pyrolysis products on the shear layer structure, heat release rate, and pollutant emission characteristics; and (4) to study the effect of modifying the shear layer characteristics on the

ensuing flame behavior. The work performed in this quarter consisted of the following tasks: (1) design, fabrication, and debugging of the particulate feeding system, (2) automating the data acquisition system. In the next quarter, the author plans to work on flow visualization of the shear layer and velocity field measurements with and without nonreacting particulates.

7178 (DOE/PC/93226–T4) **Investigation of mineral transformations and ash deposition during staged combustion. Quarterly technical progress report, July 1–September 30, 1994.** Harb, J.N. Brigham Young Univ., Provo, UT (United States). 3 Nov 1994. 14p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-93PC93226. Order Number DE95005194. Source: OSTI; NTIS; GPO Dep.

Progress during the fourth quarter of a three-year study was made in three areas: (1) coal selection and characterization (Task 1), (2) combustor modifications and preliminary testing (Task 2), and (3) sample analysis (Task 4). A detailed CCSEM analysis of the mineral content of Pittsburgh #8 was performed during the quarter. This analysis includes identification of the major mineral phases found in the coal, as well as quantification of the association between the organic and inorganic phases. A large fraction of the minerals were excluded (greater than 80% mineral), although a significant fraction of the minerals was found in particles which were greater than 20% coal. Associations between specific minerals were also examined on a particle-by-particle basis. These associations provide information on the potential for coalescence of mineral grains to form complex ash species. In addition to coal analysis, the first extended coal-fired tests were completed this quarter. The deposition probe and particle collection system were also completed and tested. The reactor system performed very well, with the exception of some feeding problems which will be resolved during the next quarter. Initial samples of combustion products from the Black Thunder coal were collected and analyzed. Finally, specific tasks for the next quarter have been identified and reported.

7179 (DOE/PC/94211–T1) **Co-firing high sulfur coal with refuse derived fuels. Technical progress report No. 1, [September–November 1994].** Pan, Wei-Ping; Riley, J.T.; Lloyd, W.G. Western Kentucky Univ., Bowling Green, KY (United States). Dept. of Chemistry. 30 Nov 1994. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-94PC94211. Order Number DE95006243. Source: OSTI; NTIS; GPO Dep.

This project is being coordinated with an ongoing project at Western Kentucky University that is being supported by the Southeastern Regional Biomass Energy Program through the Tennessee Valley Authority. Fluidized bed combustion tests will be performed on municipal solid waste blended with high-sulfur and high-chlorine coals in a laboratory scale combustor. The purpose of the tests is to evaluate combustion performance, the extent of the inorganic acid gases (HCl and SO_x) and chlorinated organic compound formation, the effect of chlorine species on SO_2 removal with a sorbent, and the effect of sulfur species on the formation of chlorinated organic compounds from MSW for a range of bed temperatures, excess air levels, MSW/coal ratios, and S/Cl ratios. Flue gas samples will be collected and analyzed at three locations: free board, cyclone inlet, and cyclone outlet. Analytical methods used will include ion chromatography, gas chromatography, and mass spectrometry. Waste stream ash samples will be collected from the cyclone catch and analyzed for unburned carbon, chlorine, chlorinated benzenes, polychlorinated biphenyls, chlorinated phenols, dioxins, furans, and metal content. Major, minor, and trace elements in the ash will be determined by x-ray fluorescence and inductively coupled plasma-atomic emission spectroscopy. Accomplishments for the first quarter are presented.

7180 (FAAR–23/1993, pp. 7-12) **Numerical simulation of vapour-aerosol dynamics in high temperature processes.** Jokiniemi, J.K. (Technical Research Centre of Finland, Espoo (Finland). Aerosol Technology Group); Lazaridis, M.; Lehtinen, K.E.J.; Kauppinen, E.I. Finnish Association for Aerosol Research, Espoo (Finland). 1993. (CONF-9306401–: 5. Finnish national aerosol symposium, Espoo (Finland), 1-3 Jun 1993). In *Report series in aerosol science*. 292p. Order Number DE95737628. Source: OSTI; NTIS.

In solid and liquid fuel combustion processes aerosol particles are formed from volatilised species and from non-volatilised mineral inclusions. The behaviour of these particles is of great importance when considering slagging and fouling in commercial boilers and toxic flue gas emissions. In this study we have constructed a general ABC (Aerosol Behaviour in Combustion) computer model to describe the formation, growth and deposition of aerosol particles formed from vapour species and ash components in combustion processes. So far this model has been applied for alkali species behaviour in pulverised and fluidized bed coal combustion processes as well as kraft recovery boilers.

7181 (FAAR–23/1993, pp. 69-74) **Real scale studies on alkali metal transformations in atmospheric CFBC of coal.** Lind, T. (Technical Research Centre of Finland, Espoo (Finland). Aerosol Technology Group.); Kauppinen, E.I.; Jokiniemi, J.K.; Maenhaut, W.; Maekinen, M. Finnish Association for Aerosol Research, Espoo (Finland). 1993. (CONF-9306401–: 5. Finnish national aerosol symposium, Espoo (Finland), 1-3 Jun 1993). In *Report series in aerosol science*. 292p. Order Number DE95737628. Source: OSTI; NTIS.

In this study, we address the sodium and potassium behaviour during the combustion of bituminous coal in a real-scale circulating fluidised bed. The bituminous coal and limestone additive used in the study were carefully characterised for composition and particle size distributions (PSD). The ash PSDs and compositions after the combustion were characterised from ESP-collected fly ash and boiler bottom ash. Experiments were carried out to determine the aerosol characteristics, i.e. the detailed fly ash particle size distributions in the particle size range 0.01-70 μm, and the gas compositions at conditions immediately before the electrostatic precipitator (ESP). A numerical aerosol simulation model was developed to describe the combustion aerosol dynamics. The model combined with local chemical equilibrium calculations was used to study the behaviour of particulate matter and gaseous species in the aerosol formed in the FBC.

7182 (FAAR–23/1993, pp. 81-86) **Field studies on ash transformation during pulverized coal combustion of bituminous coal.** Joutsensaari, J. (Technical Research Centre of Finland, Espoo (Finland). Aerosol Technology Group); Kauppinen, E.I.; Jokiniemi, J.K. Finnish Association for Aerosol Research, Espoo (Finland). 1993. (CONF-9306401–: 5. Finnish national aerosol symposium, Espoo (Finland), 1-3 Jun 1993). In *Report series in aerosol science*. 292p. Order Number DE95737628. Source: OSTI; NTIS.

In this study, we have focused on ash vaporization and condensation behaviour in the real scale pulverized combustion of bituminous coal from Poland. Gas phase fly ash particle mass, number and composition size distributions were determined experimentally at conditions upstream the electrostatic precipitator (ESP) by utilizing advanced aerosol measurement methods. The morphology of fly ash particles was studied by SEM (Scanning Electroni Microscopy). In addition, we characterized in detail the parent coal with respect to distribution of mineral matter by CCSEM (Computer Controlled Scanning Electron Microscopy) and CF (Chemical fractionation) methods. Both bottom and fly ash collected by the ESP were analyzed using CCSEM to observe the reactions between organically bound inorganic species and mineral inclusions during the combustion process. The vaporization behaviour of both organically and inorganically distributed mineral species is discussed based on experimental data.

7183 (FAAR–23/1993, pp. 112-117) **Particle emissions from pressurized fluidized bed combustion.** Jalovaara, J. (Helsinki Univ. of Technology, Otaniemi (Finland). Dept. of Energy Engineering); Hippinen, I. Finnish Association for Aerosol Research, Espoo (Finland). 1993. (CONF-9306401–: 5. Finnish national aerosol symposium, Espoo (Finland), 1-3 Jun 1993). In *Report series in aerosol science*. 292p. Order Number DE95737628. Source: OSTI; NTIS.

This presentation reports a part of the study of particle emissions and their reduction using a fibrous, layered, ceramic candle filter in pressurized fluidized bed combustion made at Helsinki University of Technology during 1991-1992.

7184 (FAAR–23/1993, pp. 167-172) **Fine particle aspects of fluidized bed processes.** Horio, M. (Tokyo Univ. of Agriculture

and Technology (Japan). Dept. of Chemical Engineering). Finnish Association for Aerosol Research, Espoo (Finland). 1993. (CONF-9306401–: 5. Finnish national aerosol symposium, Espoo (Finland), 1-3 Jun 1993). In *Report series in aerosol science*. 292p. Order Number DE95737628. Source: OSTI; NTIS.

Fluidization is a unique unit operation of chemical engineering rich in topics of research and developments. In 1960's, when the fundamental formulation of dense suspension was completed and bubble models such as Davidson's became the basic tools for analysis and design, the purely scientific interest in the fluidization phenomena that has been held by physical scientists seemed to have faded away. However, the spectrum of fluidization has become quite wide. In the 60's we did not have 'fast fluidization' nor 'group C (cohesive) powders'. Now in the 90's again the attitude to look at fluidization as a natural phenomenon of particle suspensions is becoming more important. In this article the historical developments of knowledge on fluidization is reviewed and energetics and phase transition of dispersed solids are discussed. (orig.)

7185 (FAAR–23/1993, pp. 173-178) **Simultaneous in-situ measurements of temperature and size of burning char particles in a fluidized bed furnace by means of fiber optic pyrometry.** Stenberg, J. (Tampere Univ. of Technology (Finland). Plasma Technology Lab.); Hernberg, R. Finnish Association for Aerosol Research, Espoo (Finland). 1993. (CONF-9306401–: 5. Finnish national aerosol symposium, Espoo (Finland), 1-3 Jun 1993). In *Report series in aerosol science*. 292p. Order Number DE95737628. Source: OSTI; NTIS.

Fluidized bed combustion is a particularly demanding environment for diagnostics. Important parameters are fuel particle temperature, size and their interrelation, and further, the spatial distribution of fuel particles in the reactor. It has been demonstrated that the pyrometric fiber optic probe is a very viable tool for particle diagnostics in a fluidized bed furnace. In addition to the temperature of the bed and fuel particles it is capable of producing valuable results regarding the size of fuel particles as well. The size information in combination with the particle temperature can serve the study many different aspects of interest in fluidized bed technology, like fuel reactivity, furnace dynamics etc.

7186 (TTKK-LT–90) **Combustion experiments of fuel gases in atmospheric fluidized bed combustor test rig.** Wallen, V. Tampere Univ. of Technology (Finland). Thermal Engineering. 1993. 22p. Order Number DE95737622. Source: OSTI; NTIS.

This paper describes the combustion measurements done in a bubbling fluidized bed combustor at Tampere University of Technology. This study forms a part of a larger project, the object of which is to develop a total model for ignition and combustion of the volatile matter released from solid high-volatile fuel in a bubbling fluidized bed. In modelling of fluidized bed combustor it is important to describe correctly the combustion reactions and the phases in which they occur. In peat combustion, although a large percentage of the heat content can be contained within the volatiles, the mechanism of volatile combustion has not been determined so far. In a fluidized bed every sand particle acts like a wall and the so-called 'wall effects' have a strong influence on the combustion mechanism. Therefore combustion models in which the wall reactions are not included cannot be used in the particulate or in the bubble phase of a fluidized bed. The moisture present in bed was found to be of great importance especially when carbon monoxide was used as fuel gas. The effect of moisture to the reaction rate of carbon monoxide-air mixture was found to be opposite to that measured in air. This means, that correlations for carbon monoxide oxidation found in the literature cannot be used when modelling combustion inside a fluidized bed. The results presented in this paper are some of those I got from nearly 300 test runs. A lot more experiments have to be made with different fuel gases before we can better understand the nature of volatile combustion in fluidized bed.

0150 Economic, Industrial, and Business Aspects

Refer also to citation(s) 7165

7187 (INIS-mf–15077) **The future of brown coal mining in Germany. Lectures.** Boecker, D.; Steinbach, W.C. No corporate text available. 1992. 34p. (In German). (CONF-9210494–: Politics and science: the future of brown coal mining in Germany, Bonn (Germany), 6 Oct 1992). Order Number DE95738952. Source: OSTI; NTIS (US Sales Only); INIS.

Like most other sectors, the German brown coal mining industry is facing new challenges with the unification process. Major problems are also raised by the supply network, another dramatic GDR legacy - namely the need to recultivate the mining-devasted areas. Ideas to overcome such problems are shown by Dr.-Ing. Dietrich Boecker (board member of Rheinbau Ltd.) and the Leipzig government president, Mr. Walter Christian Steinbach, in the realm of an organised politics and science discussion on October 6, 1992. (HS). 6 figs.

7188 (KE–93038G) **Development of CCS application technology in industries (II).** Kim, D.C (Korea Institute of Energy Research, Taejon (Korea, Republic of)); Kim, J.D.; Shin, D.H.; Roh, N.S. No corporate text available. Dec 1993. 165p. (In Korean). Order Number DE95744281. Source: OSTI; NTIS (US Sales Only).

In this paper, a research on such 3 areas as : (1) investigate and analysis of the industrial companies (potential CCS coal consumers) which are expected to use CCS coal in their boilers ; (2) economic evaluation on CCS project ; and (3) analysis of the formation method of CCS coal consortium for the commercialization of CCS project were carried out. Of these, priority was placed to economic evaluation of CCS project, which was carried out by the computer program (FORTRAN) developed. (author). refs., figs., tabs.

02 PETROLEUM

0202 Reserves, Geology, and Exploration

Refer also to citation(s) 7201, 7223, 7225, 8647, 8649

7189 (DOE/BC/14477–16) **An experimental and theoretical study to relate uncommon rock/fluid properties to oil recovery. Quarterly report, July 1, 1993–September 30, 1993.** Watson, R.W.; Ertekin, T.; Owolabi, O.O. Pennsylvania State Univ., University Park, PA (United States). [1995]. 47p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-89BC14477. Order Number DE95005327. Source: OSTI; NTIS; GPO Dep.

The major objective of the current quarter is to develop empirical models to relate residual oil saturation and oil recovery with rock-pore characteristics, for sandstones. The developed models are to be presented at both breakthrough and at floodout. For the purpose of the development of the models, the set of data are to be separated into common and uncommon rock/fluid properties.

7190 (DOE/BC/14477–17) **An experimental and theoretical study to relate uncommon rock/fluid properties to oil recovery. Quarterly report, October 1, 1993–December 31, 1993.** Watson, R.W.; Ertekin, T.; Owolabi, O.O. Pennsylvania State Univ., University Park, PA (United States). [1995]. 39p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-89BC14477. Order Number DE95005328. Source: OSTI; NTIS; GPO Dep.

The major objective of the current quarter is to develop empirical models to relate residual oil saturation and oil recovery with rock-pore characteristics, for limestone. The developed models are to be presented at both breakthrough and at floodout. For the purpose of the development of the models, the set of data are to be separated into common and uncommon rock/fluid properties.

7191 (DOE/BC/14893–4) **Integration of advanced geoscience and engineering techniques to quantify inter-well heterogeneity. Quarterly technical report, July 1, 1994–September 30, 1994.** Buckley, J.S.; Weiss, W.W.; Ouenes, A. New Mexico Inst. of Mining and Technology, Socorro, NM (United States). [1995]. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-93BC14893. (PRRC–94-49). Order Number DE95005357. Source: OSTI; NTIS; GPO Dep.

The objective of this project is to integrate advanced geoscience and reservoir engineering concepts with the goal of quantifying the dynamics of fluid-rock and fluid-fluid interactions as they relate to

reservoir architecture and lithologic characterization. This interdisciplinary effort will integrate geological and geophysical data with engineering and petrophysical results through reservoir simulation. Subcontractors from Stanford University and the University of Texas at Austin (UT) are collaborating on the project. Several members of the PRRC staff are participating in the development of improved reservoir description by integration of the field and laboratory data, as well as in the development of quantitative reservoir models to aid performance predictions.

7192 (DOE/BC/14896–4) **Geological and petrophysical characterization of the Ferron Sandstone for 3-D simulation of a fluvial-deltaic reservoir. Quarterly report, July 1–September 30, 1994.** Allison, M.L. (Utah Geological and Mineral Survey, Salt Lake City, UT (United States)). USDOE Bartlesville Project Office, OK (United States). 30 Oct 1994. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-93BC14896. Order Number DE95005334. Source: OSTI; NTIS; GPO Dep.

The objective of this project is to develop a comprehensive, interdisciplinary, and quantitative characterization of a fluvial-deltaic reservoir which will allow realistic inter-well and reservoir-scale modeling to be developed for improved oil-field development in similar reservoirs world-wide. The geological and petrophysical properties of the Cretaceous Ferron Sandstone in east-central Utah will be quantitatively determined. Both new and existing data will be integrated into a 3-D representation of spatial variations in porosity, storativity, and tensorial rock permeability at a scale appropriate for inter-well to regional-scale reservoir simulation. Results could improve reservoir management through proper infill and extension drilling strategies, reduction of economic risks, increased recovery from existing oil fields, and more reliable reserve calculations. Transfer of the project results to the petroleum industry is an integral component of the project.

7193 (DOE/BC/14970–1) **Gypsy Field project in reservoir characterization. Quarterly progress report, May 19–September 30, 1994.** O'Meara, D.J. Jr. Oklahoma Univ., Norman, OK (United States). Center for Reservoir Characterization. [1994]. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-94BC14970. Order Number DE95005315. Source: OSTI; NTIS; GPO Dep.

The overall objective of this project is to use the extensive Gypsy Field laboratory and data set as a focus for developing and testing reservoir characterization methods that are targeted at improved recovery of conventional oil. The Gypsy Field laboratory consists of coupled outcrop and subsurface sites which have been characterized to a degree of detail not possible in a production operation. Data from these sites entail geological descriptions, core measurements, well logs, vertical seismic surveys, a 3D seismic survey, crosswell seismic surveys, and pressure transient well tests. The overall project consists of four interdisciplinary sub-projects which are closely interlinked: Modeling deposition environments; Integrated 3D seismic interpretation; Sweep Efficiency; and Tracer testing. During this quarter, main activities involved three sub-projects: Modeling Depositional Environments. The use of thin-plate and tension splines for detecting discontinuities in geological or petrophysical properties was examined. In an example derived from the Gypsy outcrop, tension splines were clearly superior. Integrated 3D Seismic Interpretation. A three-dimensional geological model of the Gypsy subsurface site has been constructed using 3D seismic data, constrained by well log and core data. Eight seismic horizons were mapped based on seismic data yielding geometrical information on major sand and shale zones. Sweep Efficiency. As a first step in examining the cubature method as an alternative to IMPES schemes, the equations and a numerical scheme have been formulated for two-dimensional flow in heterogeneous reservoirs. Development has begun on a computer program for implementing this numerical scheme.

7194 (NEI-NO–472) **The perspectives of Norwegian petroleum resources.** Nystad, A.N. (Norwegian Petroleum Directorate (Norway)). Norsk Petroleumsforening, Oslo (Norway). 1993. 9p. (CONF-930567–1: 14. Bergen conference on oil and economics, Bergen (Norway), 10-11 May 1993). Order Number DE95737640. Source: OSTI; NTIS.

In order to relate the remaining Norwegian petroleum resources to a time perspective one has to make assumptions of the future production of oil and gas. If there is assumed an average annual oil production of 80 million tons (the average the last 5 years) and an average annual gas production of 65 million ton oil equivalent (t.o.e.), which is a realistic future level of exploitation, the oil resources will last for approximately 45 years and the gas resources for approximately 80 years. There is expected that the future resources will be more challenging to find, exploit and commercialize, than those resources which are discovered so far. It is therefore important to follow strategies which maintain a high economical efficiency in all phases of the petroleum activity by looking into the possibilities for improvements. This is a continuous process which is important in order to maintain the Norwegian Continental Shelf internationally competitive. Profitable projects within improved oil recovery from existing fields, technical solutions which make it possible to exploit smaller oil and gas fields and cost efficient ways in order to discover the remaining resources on the Norwegian Shelf must be established. The remaining petroleum resources give a long term perspective in relation to the future petroleum activities on the Norwegian Shelf. 4 figs.

0203 Drilling and Production

Refer also to citation(s) 7191, 7192, 7193, 8180

7195 (DOE/BC–94/1) **Enhanced oil recovery. Progress review, October–December 1993.** USDOE Bartlesville Project Office, OK (United States). 31 Dec 1993. 117p. Sponsored by USDOE, Washington, DC (United States). Order Number DE94000200. Source: OSTI; NTIS; GPO Dep.

This document details current research in the area of enhanced recovery of petroleum as sponsored by the DOE. Progress reports are provided for over thirty projects.

7196 (DOE/BC/14654–T6) **Simulation studies to evaluate the effect of fracture closure in the performance of naturally fractured reservoirs. Third quarterly progress report.** Dauben, D.L. K and A Energy Consultants, Inc., Tulsa, OK (United States). 15 Jul 1992. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-90BC14654. Order Number DE95005803. Source: OSTI; NTIS; GPO Dep.

The study has two principal objectives: (1) to evaluate the effects of fracture closure on the recovery of oil and gas reserves from naturally fractured petroleum or natural gas reservoirs, (2) to evaluate procedures for improving the recovery of these reserves using innovative fluid injection techniques to maintain reservoir pressure and mitigate the impact of fracture closure. The total scope of the study has been subdivided into three main tasks: baseline studies (non-pressure sensitive fractures), studies with pressure sensitive fractures, and innovative approaches for improving oil recovery.

7197 (DOE/BC/14654–T8) **Simulation studies to evaluate the effect of fracture closure on the performance of naturally fractured reservoirs. Annual report.** K and A Energy Consultants, Inc., Tulsa, OK (United States). Nov 1992. 134p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-90BC14654. Order Number DE95005805. Source: OSTI; NTIS; GPO Dep.

The second year of this three-year research program to evaluate the effect of fracture closure on the recovery of oil and gas from naturally fractured reservoirs has been completed. The overall objectives of the study are to: (1) evaluate the reservoir conditions where fracture closure is significant, and (2) evaluate innovative fluid injection techniques capable of maintaining pressure within the reservoir. Simulation studies have been conducted with a dual porosity simulator capable of simulating the performance of vertical and horizontal wells. Each simulation model has been initialized with properties typical of the Austin Chalk reservoir in Pearsall Field, Texas. During year one, simulations of both vertical and horizontal well performance were made assuming that fracture permeability was insensitive to pressure charge. The results confirmed that horizontal wells could increase both rate of oil recovery and total oil recovery from naturally fractured reservoirs. During the second year the performances of the same vertical and horizontal wells

were evaluated with the assumption that fracture permeability was a function of reservoir pressure. This required repetition of most of the natural depletion cases simulated in year one while invoking the pressure-sensitive fracture permeability option. To investigate sensitivity to in situ stress, two stress conditions were simulated for each primary variable. The water injection cases, begun in year one, were extended to include most of the reservoir parameters investigated for natural depletion, including fracture permeability as a function of net stress and the use of horizontal wells. The results thus far confirm that pressure-sensitive fractures degrade well performance and that the degradation is reduced by water injection pressure maintenance. Furthermore, oil recovery can be significantly increased by water injection pressure maintenance.

7198 (DOE/BC/14654–T9) **Simulation studies to evaluate the effect of fracture closure on the performance of naturally fractured reservoirs. Annual report.** K and A Energy Consultants, Inc., Tulsa, OK (United States). Oct 1991. 129p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-90BC14654. Order Number DE95005806. Source: OSTI; NTIS; GPO Dep.

The first of a three-year research program to evaluate the effect of fracture closure on the recovery of oil and gas from naturally fractured reservoirs has been completed. The objectives of the study are to (1) evaluate the reservoir conditions where fracture closure is significant, and (2) evaluate innovative fluid injection techniques capable of maintaining pressure within the reservoir. Simulation studies were conducted with a dual porosity simulator capable of simulating the performance of vertical and horizontal wells. Each simulator was initialized using properties typical of the Austin Chalk reservoir in Pearsall Field, Texas. Simulations of both vertical and horizontal well performance were made assuming that fracture permeability was insensitive to pressure change. Sensitivity runs indicate that the simulator is predicting the effects of critical reservoir parameters in a logical and consistent manner. The results to-date confirm that horizontal wells can increase both oil recovery rate and total oil recovery from naturally fractured reservoirs. The year one simulation results will provide the baseline for the ongoing study which will evaluate the performance degradation caused by the sensitivity of fracture permeability to pressure change, and investigate fluid injection pressure maintenance as a means to improve oil recovery performance. The study is likely to conclude that fracture closure decreases oil recovery and that pressure support achieved through fluid injection could be beneficial in improving recovery.

7199 (DOE/BC/14662–15) **Quantitation of microbial products and their effectiveness in enhanced oil recovery. Final report.** Zhang, X.; Knapp, R.M.; McInerney, M.J. Oklahoma Univ., Norman, OK (United States). Feb 1995. 154p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-90BC14662. Order Number DE95000121. Source: OSTI; NTIS; GPO Dep.

A three-dimensional, three-phase, multiple-component numerical simulator was developed to investigate transport and growth of microorganisms in porous media and the impacts of microbial activities on oil recovery. The microbial activities modeled in this study included: (1) growth, retention, chemotaxis, and end product inhibition of growth, (2) the formation of metabolic products, and (3) the consumption of nutrients. Major mechanisms for microbial enhanced oil recovery (MEOR) processes were modeled as follows: (1) improvement in sweep efficiency of a displacement process due to in situ plugging of highly-permeable production zones by cell mass or due to improved mobility control achieved by increasing the viscosity of the displacing fluid with a biopolymer, and (2) solubilization and mobilization of residual oil in porous media due to the reduction of the interfacial tension between oleic and aqueous phases by the production of a biosurfactant. The numerical solutions for mathematical models involved two steps. The distributions of pressure and phase saturations were solved from continuity equations and Darcy flow velocities for the aqueous phase were computed. This was followed by the solution of convection-dispersion equations for individual components. Numerical solutions from the proposed model were compared to results obtained from analytical equations, commercial simulators, and laboratory experiments. The comparison indicated that the model accurately quantified microbial transport and metabolism in porous media, and predicted additional crude oil recovery due to microbial processes. 50 refs., 41 figs., 26 tabs.

7200 (DOE/BC/14664–12) **Polysaccharides and bacterial plugging. Final report, 1992–1993.** Fogler, H.S. Michigan Univ., Ann Arbor, MI (United States). Feb 1995. 106p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-90BC14664. Order Number DE95000127. Source: OSTI; NTIS; GPO Dep.

In situ core plugging experiments and transport experiments, using the model bacteria Leuconostoc m., have been conducted. Results demonstrated that cellular polysaccharide production increases cell distribution in porous media and caused an overall decrease in media permeability. Further, a parallel core plugging experiment was conducted and showed the feasibility of this system to divert injection fluid from high permeability zones into low permeability zones within porous media as is needed for profile modification. To implement this type of application, however, controlled placement of cells and rates of polymer production are needed. Therefore, kinetic studies were performed. A kinetic model was subsequently developed for Leuconostoc m. bacteria. This model is based on data generated from batch growth experiments and allows for the prediction of saccharide utilization, cell generation, and dextran production. These predictions can be used to develop injection strategies for field implementation. Transport and in situ growth micromodel experiments have shown how dextran allow cells to remain as clusters after cell division which enhanced cell capture and retention in porous media. Additional Damkohler experiments have been performed to determine the effects of the nutrient injection rate and nutrient concentration on the rate of porous media plugging. As shown experimentally and as predicted by a model for in situ growth, an increase in nutrient concentration and/or its injection rate will result in a faster rate of porous media plugging. Through continuum model simulations, it has been shown that the initial cell profiles play a key role on the core plugging rate. Controlling the location of the inoculating cells is thus another key factor in using bacteria for profile modification.

7201 (DOE/BC/14831–12) **Assist in the recovery of bypassed oil from reservoirs in the Gulf of Mexico. Quarterly status report (final), July 1–September 30, 1994.** Schenewerk, P.A. Louisiana State Univ., Baton Rouge, LA (United States). Dept. of Petroleum Engineering. 30 Nov 1994. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-92BC14831. Order Number DE95005344. Source: OSTI; NTIS; GPO Dep.

The objective of this research is to assist the recovery of non contacted oil from known reservoirs on the Outer Continental Shelf in the Gulf of Mexico. Mature offshore reservoirs, declining oil reserves, declining production, and other natural forces are accelerating the abandonment of offshore oil resources and production platforms. As these offshore wells are plugged and the platforms are abandoned, an enormous volume of remaining oil will be permanently abandoned. Significant quantities of this oil could be recovered using advanced technologies now available if the resource can be identified. This project will proceed under three broad phases: (1) Analysis – TORIS level data will be collected on the major fields located in the piercement salt dome province of the Gulf of Mexico Outer Continental Shelf. Representative reservoirs will be studied in detail in order to evaluate undeveloped and attic oil reserve potential. These detailed investigations will be used to calibrate the TORIS level predictive models. The recovery potential of advanced secondary and enhanced oil recovery processes and the exploitation of undeveloped and attic oil zones for salt dome reservoirs in the Gulf of Mexico will be assessed. (2) Supporting Research – Supporting research will focus on the modification of public domain reservoir simulation models to accurately simulate the conditions encountered in the piercement salt dome province of the Gulf of Mexico. Laboratory research will focus on the development of fluid relationships that will be used in the simulation of miscible and immiscible processes in the project area. (3) Technology Transfer – A significant effort is planned to transfer the

results of this project to potential users of the technology. Technology transfer activities will also provide feedback channels that will help keep the analysis and supporting research focused on the most important problems associated with this project.

7202 (DOE/BC/14856–1) **A model technology transfer program for independent operators: Kansas Technology Transfer Model (KTTM).** Schoeling, L.G. Kansas Univ., Lawrence, KS (United States). Energy Research Center. Sep 1993. 133p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-92BC14856. Order Number DE95001703. Source: OSTI; NTIS; GPO Dep.

This report describes the development and testing of the Kansas Technology Transfer Model (KTTM) which is to be utilized as a regional model for the development of other technology transfer programs for independent operators throughout oil-producing regions in the US. It describes the linkage of the regional model with a proposed national technology transfer plan, an evaluation technique for improving and assessing the model, and the methodology which makes it adaptable on a regional basis. The report also describes management concepts helpful in managing a technology transfer program. The original Tertiary Oil Recovery Project (TORP) activities, upon which the KTTM is based, were developed and tested for Kansas and have proved to be effective in assisting independent operators in utilizing technology. Through joint activities of TORP and the Kansas Geological Survey (KGS), the KTTM was developed and documented for application in other oil-producing regions. During the course of developing this model, twelve documents describing the implementation of the KTTM were developed as deliverables to DOE. These include: (1) a problem identification (PI) manual describing the format and results of six PI workshops conducted in different areas of Kansas, (2) three technology workshop participant manuals on advanced waterflooding, reservoir description, and personal computer applications, (3) three technology workshop instructor manuals which provides instructor material for all three workshops, (4) three technologies were documented as demonstration projects which included reservoir management, permeability modification, and utilization of a liquid-level acoustic measuring device, (5) a bibliography of all literature utilized in the documents, and (6) a document which describes the KTTM.

7203 (DOE/BC/14860–8) **Detailed evaluation of the West Kiehl alkaline-surfactant-polymer field project and it's application to mature Minnelusa waterfloods. Technical progress report, July–September, 1994.** Pitts, M.J. Surtek, Inc., Golden, CO (United States). [1994]. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-93BC14860. Order Number DE95005332. Source: OSTI; NTIS; GPO Dep.

The objective is to (1) quantify the incremental oil produced from the West Kiehl alkaline-surfactant-polymer project by classical engineering and numerical simulation techniques, (2) quantify the effect of chemical slug volume on incremental oil in the two swept areas of the field, (3) determine the economics of the application of the alkaline-surfactant-polymer technology, (4) forecast the results of injecting an alkaline-surfactant-polymer solution to mature waterfloods and polymer floods, and (5) provide the basis for independent operators to book additional oil reserves by using the alkaline-surfactant-polymer technology. A geological study of 72 Minnelusa field surrounding the West Kiehl is complete. Of the 72 fields, 35 were studied in detail and, from these 35 fields, Prairie Creek South and Simpson Ranch were selected for numerical simulation as representative of Minnelusa waterfloods and polymer floods, respectively. This report documents the numerical simulation waterflood, polymer flood, alkaline-surfactant flood and alkaline-surfactant-polymer flood predictions from the West Kiehl, Simpson Ranch and Prairie Creek South fields.

7204 (DOE/BC/14861–5) **Horizontal oil well applications and oil recovery assessment. Technical progress report-final, July 1994–September 1994.** McDonald, W.J. Maurer Engineering, Inc., Houston, TX (United States). 3 Dec 1994. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-93BC14861. Order Number DE95005333. Source: OSTI; NTIS; GPO Dep.

Thousands of horizontal wells are being drilled each year in the U.S.A. and around the world. Horizontal wells have increased oil and gas production rates 3 to 8 times those of vertical wells in many areas and have converted non-economic oil reserves to economic reserves. However, the use of horizontal technology in various formation types and applications has not always yielded anticipated success. The primary objective of this project is to examine factors affecting technical and economic success of horizontal well applications. The project's goals will be accomplished through six tasks designed to evaluate the technical and economic success of horizontal drilling, highlight current limitations, and outline technical needs to overcome these limitations. Data describing operators experiences throughout the domestic oil and gas industry will be gathered and organized. Canadian horizontal technology will also be documented with an emphasis on lessons the U.S.A. industry can learn from Canada's experience. MEI databases containing detailed horizontal case histories will also be used. All these data will be categorized and analyzed to assess the status of horizontal well technology and estimate the impact of horizontal wells on present and future domestic oil recovery and reserves.

7205 (DOE/BC/14862–7) **Productivity and injectivity of horizontal wells. Quarterly report, July 1, 1994–September 30, 1994.** Fayers, F.J. Stanford Univ., CA (United States). Dept. of Petroleum Engineering. [1995]. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-93BC14862. Order Number DE95005338. Source: OSTI; NTIS; GPO Dep.

This quarterly report is entirely devoted to presenting samples of the results of the data analyses for horizontal drilling studies. In addition, a data compilation of Excel worksheets containing data on two-phase flow measurements at the Marathon Oil Company is discussed. Complete data analyses will be presented in the next annual report.

7206 (DOE/BC/14875–5) **Research program on fractured petroleum reservoirs. Quarterly progress report, July 1–September 30, 1994.** Firoozabadi, A. Reservoir Engineering Research Inst., Palo Alto, CA (United States). 30 Oct 1994. 100p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-93BC14875. Order Number DE95005326. Source: OSTI; NTIS; GPO Dep.

This report describes results from three projects. Project 1, Miscible displacement in fractured/layered porous media, studies the crossflow in the medium incorporating gravity, viscous, and phase behavior effects. Part 1 covers layered media, and part 2 covers fractured media. Project 2, Supersaturation, critical saturation and residual gas saturation in porous media, investigates the solution gas-drive process in heavy and light oil reservoirs. The third project studies the waterflood performance of tight rock in fractured and layered reservoirs.

7207 (DOE/BC/14881–9) **Improving reservoir conformance using gelled polymer systems. Quarterly progress report, July 1–September 30, 1994.** Green, D.W.; Willhite, G.P. Kansas Univ. Center for Research, Inc., Lawrence, KS (United States). 1 Nov 1994. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-92BC14881. Order Number DE95005346. Source: OSTI; NTIS; GPO Dep.

The general objectives are to (1) to identify and develop gelled polymer systems which have potential to improve reservoir conformance of fluid displacement processes, (2) to determine the performance of these systems in bulk and in porous media, and (3) to develop methods to predict the capability of these systems to recover oil from petroleum reservoirs. This work focuses on three types of gel systems an aqueous polysaccharide (KUSP 1) system that gels as a function of pH, the chromium(III)-polyacrylamide system and the aluminum citratepolyacrylamide system. Laboratory research is directed at the fundamental understanding of the physics and chemistry of the gelation process in bulk form and in porous media. This knowledge will be used to develop conceptual and mathematical models of the gelation process. Mathematical models will then be extended to predict the performance of gelled polymer treatments in oil reservoirs. Technical progress is described for three studies: Physical and chemical characterization of gel systems (chemical reaction kinetics of KUSP1); Mechanisms of in situ gelation; and Mathematical modeling of gel systems.

7208 (DOE/BC/14883–8) **Surfactant-enhanced alkaline flooding for light oil recovery. Quarterly report, April 1–June 30, 1994.** Wasan, D.T. Illinois Inst. of Tech., Chicago, IL (United States). [1995]. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-92BC14883. Order Number DE95005370. Source: OSTI; NTIS; GPO Dep.

The overall objective of this project is to develop a very cost-effective method for formulating a successful surfactant-enhanced alkaline flood by appropriately choosing mixed alkalis which form inexpensive buffers to obtain the desired pH (between 8.5 and 12.0) for ultimate spontaneous emulsification and ultra-low tension. In addition, the novel concept of pH gradient design to optimize flood water conditions will be tested.

7209 (DOE/BC/14883–9) **Surfactant-enhanced alkaline flooding for light oil recovery. Quarterly report, July 1–September 30, 1994.** Wasan, D.T. Illinois Inst. of Tech., Chicago, IL (United States). [1995]. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-92BC14883. Order Number DE95005371. Source: OSTI; NTIS; GPO Dep.

The overall objective of this project is to develop a very cost-effective method for formulating a successful surfactant-enhanced alkaline flood by appropriately choosing mixed alkalis which form inexpensive buffers to obtain the desired pH (between 8.5 and 12.0) for ultimate spontaneous emulsification and ultra-low tension. In addition, the novel concept of pH gradient design to optimize flood water conditions will be tested.

7210 (DOE/BC/14884–9) **Surfactant loss control in chemical flooding: Spectroscopic and calorimetric study of adsorption and precipitation on reservoir minerals. Quarterly technical progress report, April 1, 1994–June 30, 1994.** Somasundaran, P. Columbia Univ., New York, NY (United States). 31 Aug 1994. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-92BC14884. Order Number DE95005358. Source: OSTI; NTIS; GPO Dep.

The aim of this contract is to elucidate the mechanisms underlying adsorption and surface precipitation of flooding surfactants on reservoir minerals. Effect of surfactant structure, surfactant combinations and other inorganic and polymeric species will also be determined. Solids of relevant mineralogy and a multi-pronged approach consisting of micro & nano spectroscopy, microcalorimetry, electrokinetics, surface tension and wettability will be used to achieve the goals. The results of this study should help in controlling surfactant loss in chemical flooding and also in developing optimum structures and conditions for efficient chemical flooding processes.

7211 (DOE/BC/14884–10) **Surfactant loss control in chemical flooding: Spectroscopic and calorimetric study of adsorption and precipitation on reservoir minerals. Quarterly technical progress report, July 1, 1994–October 31, 1994.** Somasundaran, P. Columbia Univ., New York, NY (United States). 1 Nov 1994. 14p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-92BC14884. Order Number DE95005359. Source: OSTI; NTIS; GPO Dep.

Interactions between surfactants and solids can be understood completely by studying desorption as well as adsorption. During this report period, desorption of tetradecyl trimethyl ammonium chloride (TTAC) and pentadecylethoxylated nonyl phenol (NP-15) mixtures from the alumina-water interface was studied. It was found that in tetradecyl trimethyl ammonium chloride (TTAC) rich mixtures the desorption of the two surfactants from the interface was controlled by the TTAC and was similar to the desorption of TTAC alone. At high concentrations the adsorption of the mixtures was reversible. At low concentrations, however, the desorption of TTAC showed some positive hysteresis. Since the adsorption of NP-15 was dependent upon the presence of TTAC, polyethoxylated nonyl phenol (NP-15) also, like TTAC, showed some positive desorption hysteresis. In contrast, the desorption of both these surfactants from a 1:1 TTAC:NP-15 mixture showed some negative hysteresis. It was clear that the desorption behavior of the components in the mixture system studied here can be controlled by adjusting the ratio of the two surfactants. With an increase of NP-15 in the mixtures, the desorption of surfactants becomes easier. In an attempt to understand adsorption and desorption behavior of mixed surfactant systems, regular solution theory was used to model the interactions between tetradecyl trimethyl ammonium chloride (TTAC) and nonyl phenol polyethoxylated alcohol with fifteen ethylene oxide groups (NP-15). The interaction parameter P and the monomer concentrations were calculated for different mixtures.

7212 (DOE/BC/14891–4) **Interdisciplinary study of reservoir compartments. Quarterly technical progress report, July 1, 1994–September 30, 1994.** Van Kirk, C.W. Colorado School of Mines, Golden, CO (United States). 28 Oct 1994. 58p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-93BC14891. Order Number DE95005339. Source: OSTI; NTIS; GPO Dep.

This DOE research project was established to document the integrated team approach for solving reservoir engineering problems. A field study integrating the disciplines of geology, geophysics, and petroleum engineering will be the mechanism for documenting the integrated approach. This is an area of keen interest to the oil and gas industry. The goal will be to provide tools and approaches that can be used to detect reservoir compartments, reach a better reserve estimate, and improve profits early in the life of a field.

7213 (DOE/BC/14951–8) **Integrated approach towards the application of horizontal wells to improve waterflooding performance. Quarterly technical progress report, July 1–September 30, 1994.** Kelkar, M.G.; Liner, C.; Kerr, D. Tulsa Univ., OK (United States). [1994]. 24p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FC22-93BC14951. Order Number DE95005330. Source: OSTI; NTIS; GPO Dep.

The overall purpose of the proposed project is to improve secondary recovery performance of a marginal oil field through the use of a horizontal injection well. The location and direction of the well will be selected based on the detailed reservoir description using integrated approach. The authors expect that 2 to 5% of original oil in place will be recovered using this method. This should extend the life of the reservoir by at least 10 years. The overall report is divided into three sections. In the first section, the authors discuss the new results based on the cross bore hole seismic surveys. In the second section, they discuss the geological description of the Self Unit based on Formation Microscanner Imaging (FMI) analysis. In the last section, they present the flow simulation results under different scenarios followed by the economic evaluation. Based on their economic evaluation they believe that drilling a horizontal injectional well may not be a viable option under the present oil price scenario.

7214 (DOE/BC/14952–10) **Secondary oil recovery from selected Carter sandstone oilfields–Black Warrior Basin, Alabama. Final report.** Anderson, J.C. Anderman/Smith Operating Co., Denver, CO (United States). Feb 1995. 32p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FC22-93BC14952. Order Number DE95000125. Source: OSTI; NTIS; GPO Dep.

Producibility problems, such as low reservoir pressure and reservoir heterogeneity, have severely limited oil production from the Central Bluff and North Fairview fields. Specific objectives for this project were: To successfully apply detailed geologic and engineering studies with conventional waterflood technologies to these fields in an effort to increase the ultimate economic recovery of oil from Carter sandstone fields; To extensively model, test and evaluate these technologies; thereby, developing a sound methodology for their use and optimization; and To team with Advanced Resources International and the US DOE to assimilate and transfer the information and results gathered from this study to other oil companies to encourage the widespread use of these technologies. At Central Bluff, water injection facilities were constructed and water injection into one well began in January 1993. Oil response from the waterflood has been observed at both producing wells. One of the producing wells has experienced early water breakthrough and a concomitant drop in secondary oil rate. A reservoir modeling study was initiated to help develop an appropriate operating strategy for Central Bluff. For the North Fairview unit waterflood, a previously abandoned well was converted for water injection which began in late June 1993. The reservoir is being repressurized, and unit water production has remained nil since flood

start indicating the possible formation of an oil bank. A reservoir simulation to characterize the Carter sand at North Fairview was undertaken and the modeling results were used to forecast field performance. The project was terminated due to unfavorable economics. The factors contributing to this decision were premature water breakthrough at Central Bluff, delayed flood response at North Fairview and stalled negotiations at the South Bluff site.

7215 (DOE/BC/14954–8) **Improved secondary recovery demonstration for the sooner unit. 3rd Quarter technical report, calendar year 1994, June 1, 1994–September 30, 1994.** Diversified Operating Corp., New Raymer, CO (United States). 31 Jul 1994. 21p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FC22-93BC14954. Order Number DE95005360. Source: OSTI; NTIS; GPO Dep.

The objective of this project is to demonstrate the effectiveness of geologically targeted infill drilling and improved reservoir management to obtain maximum oil recovery from the Sooner Unit in the Denver-Julesburg (D-J) Basin. The Sooner Unit Field is located about 100 miles northeast from Denver, Colorado and produces from the fluvial-deltaic Cretaceous "D" Sand formation at an average depth of 6,200 ft. The first phase of the project will involve multi-disciplinary reservoir characterization and recovery identification in which high-density 3-D seismic, detailed stratigraphy and engineering analysis will be used to identify optimum infill well sites and production/withdrawal schedules. One well will be drilled during this phase to obtain data pertinent to seismic activities. The second phase will involve implementation of the selected technologies by drilling geologically targeted infill wells and establishing production/injection schedules. Evaluation of results from the second phase will be performed using reservoir simulation, transient well tests and careful production tests of producing wells. The objective will be to compare the prediction of ultimate recovery resulting from the implementation of these technologies with that which would have occurred in the absence of these technologies. The success of this project and effective technology transfer should prompt-re-appraisal of older waterflood projects and implementation of new projects in oil provinces such as the D-J Basin.

7216 (DOE/BC/14958–T2) **Green River Formation water flood demonstration project, Uinta Basin, Utah. Quarterly technical progress report, July 1–September 30, 1994.** Lomax, J.D. (Lomax Exploration Co., Salt Lake City, UT (United States)); Nielson, D.L.; Deo, M.D. Lomax Exploration Co., Salt Lake City, UT (United States). [1994]. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FC22-93BC14958. Order Number DE95005322. Source: OSTI; NTIS; GPO Dep.

The project is designed to increase recoverable petroleum reserves in the United States. The Green River Formation in Utah's Uinta Basin contains abundant hydrocarbons that are not easily recovered by primary means. The successful Lomax Monument Butte Unit water flood will be evaluated under this contract, and based on this information, water floods will be initiated in nearby Travis and Boundary units. In 1987, Lomax Exploration Company started a water flood in the Monument Butte Unit of a Douglas Creek member of the Green River Formation. This was a low-energy, geologically heterogeneous reservoir producing a waxy crude oil. Primary production yielded about 5% of the OOIP. Due to the water flood project, total production will yield an estimated recovery of 20% OOIP. Technical progress is reported on field activities at the Monument Butte unit and the Travis unit; geologic characterization of the stratigraphy of the Travis, Monument Butte, and Boundary areas; and reservoir simulations of the Travis unit.

7217 (DOE/BC/14960–6) **Post waterflood CO_2 miscible flood in light oil, fluvial - dominated deltaic reservoirs. Technical progress report, 4th quarter, fiscal year 1994, July 1, 1994–September 30, 1994.** Texaco Exploration and Production, Inc., New Orleans, LA (United States). 15 Oct 1994. 17p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FC22-93BC14960. Order Number DE95005367. Source: OSTI; NTIS; GPO Dep.

Production from the Port Neches project has reached a new high of 500 BOPD, as shown. Production from several wells has improved after changing WAGer and CO_2 injection patterns. The WAG process appears to be effective in FDD reservoirs. The WAT process has improved the oil production rates and simultaneously decreased the CO_2 production rates from wells with high GOR. Material balance calculations indicate that the reservoir pressure remained relatively flat, and a new BHP will be taken this month to verify the calculations. Total CO_2 injection is averaging about 9.5 MMCFD, including 3.9 MMCFD purchased from Cardox, as shown, and the balance is recycled from the producing wells. Over 50% of the gas was produced from one well, Khun No. 33. A CO_2 injection line was installed to huff-puff well Khun No. 6 that did not respond yet to CO_2 injection in well Khun No. 17. After injecting a limited CO_2 volume in well Khun No. 6, this will be followed by a short shut-in period, then the well will be placed on production.

7218 (DOE/BC/14963–4) **West Hackberry Tertiary Project. Quarterly technical progress report, June 3, 1994–September 2, 1994.** Gillham, T.H. Amoco Production Co., Houston, TX (United States). 31 Aug 1994. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FC22-93BC14963. Order Number DE95005368. Source: OSTI; NTIS; GPO Dep.

The goal of the West Hackberry Tertiary Project is to demonstrate the technical and economic feasibility of combining air injection with the Double Displacement Process for tertiary oil recovery. The Double Displacement Process is the gas displacement of a water invaded oil column for the purpose of recovering oil through gravity drainage. The novel aspect of this project is the use of air as the injection fluid. The target reservoir for the project is the Camerina C-1,2,3 Sand located on the West Flank of West Hackberry Field in Cameron Parish, Louisiana. If successful, this project will demonstrate that the use of air injection in the Double Displacement Process can economically recover oil in reservoirs where tertiary oil recovery is presently uneconomic.

7219 (DOE/BC/14963–6) **West Hackberry tertiary project. Quarterly technical progress report, September 3, 1994–December 2, 1994.** Gillham, T.; Cerveny, B.; Turek, E. Amoco Production Co., Houston, TX (United States). 30 Nov 1994. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FC22-93BC14963. Order Number DE95005369. Source: OSTI; NTIS; GPO Dep.

The goal of the West Hackberry Tertiary Project is to demonstrate the technical and economic feasibility of combining air injection with the Double Displacement Process for tertiary oil recovery. The Double Displacement Process is the gas displacement of a water invaded oil column for the purpose of recovering oil through gravity drainage. The novel aspect of this project is the use of air as the injection fluid. The target reservoir for the project is the Camerina C-1,2,3 Sand located on the West Flank of West Hackberry Field in Cameron Parish, Louisiana. If successful, this project will demonstrate that the use of air injection in the Double Displacement Process can economically recover oil in reservoirs where tertiary oil recovery is presently uneconomic. The target reservoir has not produced since January of 1993 when the last of the reservoir's producing wells watered out.

7220 (DOE/BC/14977–1) **Improved efficiency of miscible CO_2 floods and enhanced prospects for CO_2 flooding heterogeneous reservoirs. Quarterly technical progress report, April 14, 1994–June 30, 1994.** Grigg, R.B.; Heller, J.P.; Schechter, D.S. New Mexico Inst. of Mining and Technology, Socorro, NM (United States). [1995]. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-94BC14977. (PRRC–94-26). Order Number DE95005318. Source: OSTI; NTIS; GPO Dep.

The objective of this work is to improve the effectiveness of CO_2 flooding in heterogeneous reservoirs. The intent is to investigate new concepts that can be applied by field operators within the next two to five years. Activities will consist of experimental research in three closely related areas: (1) further exploration of the applicability of selective mobility reduction (SMR) in the use of foam flooding, (2) possible higher economic viability of floods at slightly reduced CO_2 injection pressures, and (3) taking advantage of gravitational forces during low IFT, CO_2 flooding in tight, vertically fractured reservoirs.

7221 (DOE/BC/14977–2) **Improved efficiency of miscible CO_2 floods and enhanced prospects for CO_2 flooding heterogeneous reservoirs. Quarterly technical progress report, July**

1, 1994–September 30, 1994. Grigg, R.B.; Heller, J.P.; Schechter, D.S. New Mexico Inst. of Mining and Technology, Socorro, NM (United States). [1995]. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-94BC14977. (PRRC–94-50). Order Number DE95005319. Source: OSTI; NTIS; GPO Dep.

The objective of this work is to improve the effectiveness of CO_2 flooding in heterogeneous reservoirs. The intent is to investigate new concepts that can be applied by field operators within the next two to five years. Activities will consist of experimental research in three closely related areas: (1) further exploration of the applicability of selective mobility reduction (SMR) in the use of foam flooding, (2) possible higher economic viability of floods at slightly reduced CO_2 injection pressures, and (3) taking advantage of gravitational forces during low IFT, CO_2 flooding in tight, vertically fractured reservoirs.

7222 (DOE/BC/14983–2) **Recovery of bypassed oil in the Dundee Formation using horizontal drains. Quarterly report, 4th quarter, FY 1994.** Wood, J.R. Michigan Technological Univ., Houghton, MI (United States). Oct 1994. 23p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FC22-94BC14983. Order Number DE95005341. Source: OSTI; NTIS; GPO Dep.

Well data, including drillers' logs, wireline logs, and seismic data, from the Crystal and other Dundee hydrocarbon fields in the Michigan basin, have been acquired. Digitized logs of 342 wells that currently produce or have produced from the Dundee Formation in the seven-county study area have been purchased from Maness Petroleum Company. Multiple logs exist for each well, and include gamma ray, caliper, lithodensity, neutron porosity, various types of resistivity, and some sonic logs. Twenty to thirty cores of the Dundee Formation from throughout the state of Michigan are currently available. Cuttings samples are also available from 60 to 100 Michigan wells. The storage locations of many of these core and cuttings samples have been identified, but sampling has not yet begun. A well has been designed and permitted and will soon be drilled. This well will have both a horizontal and a vertical leg. The vertical leg well will be cored through the producing interval of the Dundee Formation and the cores will be analyzed for porosity, permeability, and fluid saturations. A full set of well logs will be run, including gamma ray, porosity, resistivity, and geochemistry logs. This data will be incorporated into the existing database for the project area and used to calibrate the MWD (Measurement While Drilling) logs which will be run during the drilling of the horizontal leg. The horizontal leg will be drilled as a sidetrack from the vertical test well. If commercial amounts of hydrocarbons are encountered, the horizontal well will be placed on production. Drilling is expected to commence in late 1994 or early 1995, after completion of an environmental survey.

7223 (DOE/BC/14984–1) **Improved recovery demonstration for Williston Basin carbonates. Quarterly report, June 1–September 30, 1994.** Luff Exploration Co., Denver, CO (United States). [1994]. 14p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FC22-94BC14984. Order Number DE95005314. Source: OSTI; NTIS; GPO Dep.

The purpose of this project is to demonstrate targeted infill and extension drilling opportunities, better determinations of oil in place, methods for improved completion efficiency and the suitability of waterflooding in certain shallow-shelf carbonate reservoirs in the Williston Basin, Montana, North Dakota and South Dakota. The majority of technical efforts during the first quarter have been concentrated on the Ordovician Red River formation in Bowman and Harding counties of North and South Dakota. The Cold Turkey Creek field area has been identified as the most suitable candidate for a 3-D seismic survey. Approximately 145 km of 1970's and 1980's vintage 2-D seismic data in Bowman county, N.D. have been cataloged for possible reprocessing. Reprocessing of these older data has been successful for 14 lines over 56 km. A 2-D seismic line has been shot over the SW Amor field area. This high-fold line is a prelude to 3-D survey design parameters and better understanding of a candidate Red River reservoir for testing water injectivity and possible unitization for secondary recovery by waterflooding. Seismic modeling of seismic shear response has begun for the Ratcliffe study area in Richland county, Montana. Secondary recovery operations by water injection and reservoir parameters have been studied by history matching using computer simulation at the West Buffalo Red River B Unit, Harding county, S.D. Results obtained from the West Buffalo history match were applied to a waterflood prediction by computer simulation for the SW Amor field. Reservoir performance parameters for volumetric drainage, transmissibility and water-drive index have been evaluated using Fetkovitch production type-curves for a sampling of Red River wells in N.D.

7224 (DOE/BC/14986–2) **CO_2 Huff-n-Puff process in a light oil shallow shelf carbonate reservoir. Quarterly technical progress report, 3rd quarter, 1994.** Wehner, S.; Smith, V.; Cole, R.; Brugman, B.; Vogt, J. Texaco Exploration and Production, Inc., Midland, TX (United States). 18 Oct 1994. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FC22-94BC14986. Order Number DE95005349. Source: OSTI; NTIS; GPO Dep.

The principal objective of the Central Vacuum Unit (CVU) CO_2 Huff-n-Puff (H-n-P) project is to determine the feasibility and practicality of the technology in a waterflooded shallow shelf carbonate environment. The results of parametric simulation of the CO_2 H-n-P process, coupled with the CVU reservoir characterization components will determine if this process is technically and economically feasible for field implementation. The technology transfer objective of the project is to disseminate the knowledge gained through an innovative plan in support of the Department of Energy's (DOE) objective of increasing domestic oil production and deferring the abandonment of shallow shelf carbonate (SSC) reservoirs. Texaco Exploration and Production Inc's. (TEPI) long-term plans are to implement a full-scale miscible CO_2 project in the CVU. However, the current market precludes acceleration of such a capital intensive project. The DOE partnership provides some relief to the associated R and D risks, allowing TEPI to evaluate a proven Gulf-coast sandstone technology in a waterflooded carbonate environment. Technical progress is described on the following studies: Porosity and permeability relationships; Initial water saturation and oil-water contact; Geostatistical realization; and Parametric simulation.

7225 (DOE/BC/14990–1) **Application of reservoir characterization and advanced technology to improve recovery and economic in a lower quality shallow shelf carbonate reservoir. Third quarter 1994, August 3, 1994–September 30, 1994.** Oxy USA, Inc., Welch, TX (United States). 25 Oct 1994. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FC22-94BC14990. Order Number DE95005355. Source: OSTI; NTIS; GPO Dep.

The focus of the project is to show that the use of advanced technology can improve the economics of CO_2 projects in low permeability reservoirs. The approach involves the use of tomography and pore throat measurements to enhance reservoir characterization. Cyclic CO_2 stimulations and fracture treatment will be used to increase and facilitate oil recovery to improve project economics. Reservoir description and simulation will be used along with cyclic CO_2 stimulations and fracture treatments to arrive at optimum operating plan to be instituted during the second budget period. Official start-up of the project was August 3, 1994 so September 30, 1994 represents the end of the first quarter. However, work in the area of cyclic CO_2 stimulation and reservoir characterization had taken place prior to this quarter under preaward approval. Objectives to be accomplished during the first quarter included: (1) obtaining petrophysical data, (2) preparation for drilling two observation wells, (3) designing and preparing for tomographic surveys, (4) adding injection surveys to petrophysical database, (5) initiating work on interpreting existing seismic surveys and using results to develop a relationship with petrophysical characterization, (6) began cyclic CO_2 stimulation treatments.

7226 (DOE/MT/93007–4) **Surfactant development for enhanced oil recovery. Fourth quarterly report, July 1, 1994–September 30, 1994.** Morgan State Univ., Baltimore, MD (United States). Sep 1994. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-93MT93007. Order Number DE95005378. Source: OSTI; NTIS; GPO Dep.

The objective of this report is to develop surfactant systems(s) that will be suitable for enhanced oil recovery. The developed system will be expected to be stable at high temperatures and exhibit high salinity tolerance.

7227 (NIPER/BDM–0086) **Field application of in situ combustion – past performance/future application: Proceedings.** Sarathi, P. (BDM Oklahoma, Inc., Bartlesville, OK (United States)); Olsen, D. BDM Oklahoma, Inc., Bartlesville, OK (United States); National Inst. for Petroleum and Energy Research, Bartlesville, OK (United States). Feb 1995. 248p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-94PC91008. (CONF-940450–: Field application in situ combustion practices: past, present and future applications, Tulsa, OK (United States), 21-22 Apr 1994). Order Number DE95000130. Source: OSTI; NTIS; GPO Dep.

The contents of this volume represent the collective presentations at a symposium, entitled "Field Application of in Situ Combustion–Past Performance/Future Application," which was held in Tulsa, Oklahoma, April 21–22,1994. This symposium was sponsored by the US Department of Energy (DOE) as part of its technology transfer mission and was organized by BDM-Oklahoma Inc., the management and operation contractor of DOE's National Institute for Petroleum and Energy Research (NIPER). A total of 14 technical papers were presented at the symposium and are included in these Conference Proceedings. These proceedings also included the keynote speaker's address and ensuing discussion along with the summary of panel presentations and discussion. For convenience, the proceedings are assembled into five parts, each containing related materials. The first part includes the six papers presented at the "Technology Assessment" session, followed by the papers discussion section. The second part includes all the papers presented at the "Laboratory Studies" session followed by the papers discussion section. The third part includes the five papers and the ensuing discussion that transpired during the "Case Histories" session. This section also includes a full text of one of the panel member's presentation (Paper ISC-14). The fourth part includes a summary of the panel presentation, and the discussion section. The final part includes the full text of they keynote speaker's address and the ensuing discussion. The papers are included in the order in which they were presented, and the discussion section includes selected questions posed by the audience to the speakers and their responses. Selected papers have been processed separately for inclusion in the Energy Science and Technology Database.

0204 Processing

Refer also to citation(s) 8194

7228 (DOE/MT/92020–8) **Improvement of hydrogen solubility and entrainment in hydrocracker feedstocks. Quarterly technical report, July 1, 1994–September 30, 1994.** Kabadi, V.N. North Carolina Agricultural and Technical State Univ., Greensboro, NC (United States). Dept. of Chemical Engineering. [1995]. 46p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-92MT92020. Order Number DE95005313. Source: OSTI; NTIS; GPO Dep.

A thermodynamic model has been developed to predict the solubility of hydrogen in petroleum fractions. The model for solubility of hydrogen in hydrocarbons is developed from the experimental data at temperatures up to 300°C and pressures up to 120 atmospheres, and is based on the method of Sander and et al. It includes an expression for Henry's Law constants for hydrogen in a reference solvent as a function of temperature, the virial equation of state for the vapor and modified UNIFAC correlation for activity coefficients in the liquid phase. Three hydrocarbons are used as the reference solvent, suitable correlations for pures and mixtures, and binary group interaction parameters required in the modified UNIFAC correlation are regressed as functions of temperature using experimental solubility data over a wide range of temperatures. The predicted solubility results are compared with experimental data and it is shown that this model provides a generalized method for hydrogen solubility in hydrocarbon solvents over a much wider range of temperatures and pressures than any other model available. The model will be extended for hydrogen solubility prediction in petroleum fractions using an approximate method for petroleum fraction characterization into molecular weight distributions and functional group compositions. Solubility is computed using the method of continuous thermodynamics. The most significant results of this work is a computer package for computation of hydrogen solubility in petroleum fractions at advanced temperatures and pressures which should be very valuable in the design of hydrocracking operation.

7229 (DOE/PC/90057–T10) **The selective catalytic cracking of Fischer-Tropsch liquids to high value transportation fuels. Quarterly technical progress report No. 5, first quarter fiscal year 1993, October 1, 1992–December 31, 1992.** Reagan, W.J. Amoco Oil Co., Naperville, IL (United States). Research and Development Dept. [1995]. 33p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-91PC90057. Order Number DE95005518. Source: OSTI; NTIS; GPO Dep.

Amoco Oil Company, under a contract with the United States Department of Energy, is investigating a selective catalytic cracking process to convert the Fischer-Tropsch gasoline and wax fractions to high value transportation fuels. This report describes the work in the first quarter, fiscal year, 1993.

7230 (DOE/PC/90057–T11) **The selective catalytic cracking of Fischer-Tropsch liquids to high value transportation fuels. Quarterly technical status report for first quarter fiscal year, 1994 - report No. 41, October 1, 1993–December 31, 1993.** Schwartz, M.M. Amoco Oil Co., Naperville, IL (United States). Research and Development Dept. [1995]. 21p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-91PC90057. Order Number DE95005519. Source: OSTI; NTIS; GPO Dep.

Amoco Oil Company, under a contract with the United States Department of Energy, is investigating a selective catalytic cracking process to convert the Fischer-Tropsch gasoline and wax fractions to high value transportation fuels. Characterization of the IBP-430, 430-650, and 650+ °F fractions of the three pilot plant runs that were made in August, 1993 was completed. Sasol wax was the feedstock for those runs. The catalysts used were 10% steamed USY, 10% steamed Beta, and standard equilibrium USY. A comparison of the economics for using Fischer-Tropsch wax as feedstock for hydrocracking versus catalytic cracking processes was performed. Hydrocracker values are similar to FCC product values for a simple refinery configuration (no Ether Unit). Hydrocracker values are less than FCC product values for a complex refinery configuration (contains Ether Unit). The work in this area is now complete.

7231 (PNL-SA–24557) **New nanophase iron-based catalysts for hydrocracking applications.** Matson, D.W.; Linehan, J.C.; Darab, J.G.; Camaioni, D.M.; Autrey, S.T.; Lui, E. Pacific Northwest Lab., Richland, WA (United States). Nov 1994. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-941144–25: 1994 fall meeting of the Materials Research Society (MRS), Boston, MA (United States), 28 Nov - 2 dec 1994). Order Number DE95004942. Source: OSTI; NTIS; GPO Dep.

Development of highly efficient iron-based materials for processes involving carbon-carbon bond cleavage, including petroleum hydrocracking and coal liquefaction, offers the potential for decreasing catalyst costs as well as reducing the need for expensive catalyst recovery and recycling steps. Carbon-carbon bond cleavage catalysts produced in situ at reaction conditions from nanocrystalline hydrated iron oxides, show high activity and selectivity in model compound studies. Two highly active catalyst precursors, ferric oxyhydroxysulfate (OHS) and 6-line ferrihydrite, can be produced by a flow-through hydrothermal powder synthesis method, the Rapid Thermal Decomposition of precursors in Solution (RTDS) process. Model compound studies indicate that both catalyst precursors are active at a 400 C reaction temperature, but that there are significant differences in their catalytic characteristics. The activity of 6-line ferrihydrite is highly dependent on the particle (aggregate) size whereas the activity of the OHS is essentially independent of particle size. These differences are attributed to variations in the crystallite aggregation and particle surface characteristics of the two catalyst precursor materials. Catalytic activity is retained to lower reaction temperatures in tests using OHS than in similar tests using 6-line ferrihydrite.

0205 Products and By-Products

Refer also to citation(s) 7110, 7128, 7129, 7133, 7628

0207 Economic, Industrial, and Business Aspects

Refer also to citation(s) 7242, 7824

7232 (DOE/EIA–0380(95/01)) **Petroleum marketing monthly: January 1995, with data for October 1994.** USDOE Energy Information Administration, Washington, DC (United States). Office of Oil and Gas. Jan 1995. 186p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95005610. Source: OSTI; NTIS; GPO; GPO Dep.

The Petroleum Marketing Monthly (PMM) provides information and statistical data on a variety of crude oils and refined petroleum products. The publication presents statistics on crude oil costs and refined petroleum products sales for use by industry, government, private sector analysts, educational institutions, and consumers. Data on crude oil include the domestic first purchase price, the f.o.b. and landed cost of imported crude oil, and the refiners' acquisition cost of crude oil. Refined petroleum product sales data include motor gasoline, distillates, residuals, aviation fuels, kerosene, and propane. The Petroleum Marketing Division, Office of Oil and Gas, Energy Information Administration ensures the accuracy, quality, and confidentiality of the published data in the Petroleum Marketing Monthly.

7233 (DOE/EIA–0487(93)) **Petroleum marketing annual 1993.** USDOE Energy Information Administration, Washington, DC (United States). Office of Oil and Gas. Jan 1995. 412p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95005364. Source: OSTI; NTIS; INIS; GPO Dep.

The Petroleum Marketing Annual (PMA) contains statistical data on a variety of crude oils and refined petroleum products. The publication provides statistics on crude oil costs and refined petroleum products sales for use by industry, government, private sector analysts, educational institutions, and consumers. Data on crude oil include the domestic first purchase price, the free-on-board (f.o.b.) and landed cost of imported crude oil, and the refiners acquisition cost of crude oil. Sales data for motor gasoline, distillates, residuals, aviation fuels, kerosene, and propane are presented. For this publication, all estimates have been recalculated since their earlier publication in the Petroleum Marketing Monthly (PMM). These calculations made use of additional data and corrections that were received after the PMM publication dates.

7234 (DOE/EIA–0520(95/01)) **International petroleum statistics report.** USDOE Energy Information Administration, Washington, DC (United States). Office of Energy Markets and End Use. Jan 1995. 73p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95005790. Source: OSTI; NTIS; GPO; GPO Dep.

This monthly publication provides current data on international oil production, demand, imports, exports, and stocks. Section 1 contains time series data on world oil production, and on oil demand and stocks in the OECD. Section 2 presents an oil supply/demand balance for the world. Section 3 presents data on oil imports by OECD countries. Section 4 presents annual time series data on world oil production and oil stocks, demand, and trade in OECD countries.

7235 (DOE/EIA–0538(94/95-14)) **Winter fuels report.** USDOE Energy Information Administration, Washington, DC (United States). Office of Oil and Gas. 13 Jan 1995. 77p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95005366. Source: OSTI; NTIS; INIS; GPO Dep.

The Winter Fuels Report is intended to provide concise, timely information to the industry, the press, policymakers, consumers, analysts, and State and local governments on the following topics: distillate fuel oil net production, imports and stocks on a US level and for all Petroleum Administration for Defense Districts (PADD) and product supplied on a US level; propane net production, imports and stocks on a US level and for PADD's I, II, and III; natural gas supply and disposition and underground storage for the US and consumption for all PADD's, as well as selected National average prices; residential and wholesale pricing data for heating oil and propane for those States participating in the joint Energy Information Administration (EIA)/State Heating Oil and Propane Program; crude oil and petroleum price comparisons for the US and selected cities; and a 6-10 day, 30-Day, and 90-Day outlook for temperature and precipitation and US total heating degree-days by city.

7236 (DOE/EIA–M059/A) **Documentation of the petroleum market model (PMM). Appendix: Model developer's report.** USDOE Energy Information Administration, Washington, DC (United States). Energy Supply and Conversion Div. 28 Dec 1994. 34p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95006081. Source: OSTI; NTIS; INIS; GPO Dep.

The Office of Integrated Analysis and Forecasting (OIAF) is required to provide complete model documentation to meet the EIA Model Acceptance Standards. The EIA Model Documentation: Petroleum Market Model of the National Energy Modeling System provides a complete description of the Petroleum Market Model's (PMM) methodology, and relation to other modules in the National Energy Modeling System (NEMS). This Model Developer's Report (MDR) serves as an appendix to the methodology documentation and provides an assessment of the sensitivity of PMM results to changes in input data. The MDR analysis for PMM is performed by varying several sets of input variables one-at-a-time and examining the effect on a set of selected output variables. The analysis is based on stand-alone, rather than integrated, National Energy Modeling System (NEMS) runs. This means that other NEMS modules are not responding to PMM outputs. The PMM models petroleum refining and marketing. The purpose of the PMM is to project petroleum product prices, refining activities, and movements of petroleum into the United States and among domestic regions. In addition, the PMM estimates capacity expansion and fuel consumption in, the refining industry. The PMM is also used to analyze a wide variety of petroleum-related issues and policies, in order to foster better understanding of the petroleum refining and marketing industry and the effects of certain policies and regulations. The PMM simulates the operation of petroleum refineries in the United States, including the supply and transportation of crude oil to refineries, the regional processing of these raw materials into petroleum products, and the distribution of petroleum products to meet regional demands. The essential outputs of this model are product prices, a petroleum supply/demand balance, demands for refinery fuel use, and capacity expansion.

7237 (DOE/IE/10859–T4) **Iran's petroleum policy: Current trends and the future outlook.** Pezeshki, S.; Fesharaki, F. East-West Center, Honolulu, HI (United States). Dec 1994. 54p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG01-90IE10859. Order Number DE95004466. Source: OSTI; NTIS; INIS; GPO Dep.

The Iranian economy and political situation have undergone radical changes since the 1979 Islamic revolution. The excesses of the early years of the revolution have gradually given way to moderation and a more pragmatic economic policy–based on the principles of the free market. The petroleum policy, as a subset of the economic policies, has been somewhat affected by the political and economic developments in Iran. The petroleum policy has changed from a position of no foreign participation to a position that includes a desire for foreign participation, the text of a model contract, and an attempt to introduce new technologies in the upstream sector. This report provides an overview of the key issues facing the Iranian oil industry and the economic context in which the oil industry is operating in Iran. It describes the evolution of policies meant to move the oil industry toward the free market; it discusses Iran's oil trading partners, the outlook for refining and project investments, and current and likely future developments in the natural gas and petrochemical sectors. In short, the report provides an up-to-date assessment of the Iranian petroleum sector and its likely evolution in the future.

7238 (SR/OOG–94-03) **The Energy Information Administration's assessment of reformulated gasoline: An update.** USDOE Energy Information Administration, Washington, DC (United States). Office of Oil and Gas. Dec 1994. 38p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95004836. Source: OSTI; NTIS; INIS; GPO Dep.

This report (Part II) concludes a two part study of The Energy Information Administration's (EIA) assessment of Reformulated Gasoline (RFG). The data contained herein updates EIA's previous findings and analyses on reformulated gasoline as it affects the petroleum industry. The major findings of Part II have not changed considerably from Part I: Supplies of RFG are adequate to meet demand, but a tight supply-demand balance exists, leaving the RFG system with little ability to absorb unexpected supply or delivery system disruption. In December 1994, the estimated demand for RFG was 2.6 million barrels per day, with the production capability just meeting this demand. The study concludes that current prices for RFG are consistent with the costs underlying the product, and the difference in RFG and conventional gasoline indicates confidence in supply. The study also follows the impact of recent events such as: postponement of the Renewable Oxygenate Standard, the decision to require importers to use the U.S. average baseline for limiting emissions, the disruption of the Colonial Pipeline in Texas, and Pennsylvania's request to opt-out of the RFG program.

0208 Waste Management

Refer also to citation(s) 8181

7239 (DOE/MT/92008–9) **Development of a cost effective environment compliance technology for stripper brine wells. Quarterly report, July 1, 1994–September 30, 1994.** Adewumi, M.A.; Watson, R.W. Pennsylvania State Univ., University Park, PA (United States). 7 Nov 1994. 19p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-92MT92008. Order Number DE95005380. Source: OSTI; NTIS; GPO Dep.

The specific objective of the research is to demonstrate that the characteristics of wastewater from stripper oil wells and marginal gas wells are sufficiently similar to be treated under a standardized treatment methodology, that the environmental impacts of the discharge of treated brines from both stripper oil and marginal gas wells can be adequately regulated, and that the inclusion of marginal gas wells in the same category as stripper oil wells is appropriate, especially for wells operating in the Appalachian Basin.

7240 (DOE/MT/92009–9) **Evaluation of the freeze-thaw/evaporation process for the treatment of produced waters. Quarterly technical progress report, July 1, 1994–September 30, 1994.** Boysen, J.; Morotti, J. Resource Technology Corp., Laramie, WY (United States). Jul 1994. 43p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-92MT92009. Order Number DE95005383. Source: OSTI; NTIS; GPO Dep.

The use of freeze-crystallization is being increasingly acknowledged as a low-cost, energy-efficient method for purifying contaminated water. Freeze-crystallization has been shown to be effective in removing a wide variety of contaminants from water. Water purification by using natural conditions to promote freezing appears to be an extremely attractive process for the treatment of contaminated water in many areas where natural climatic conditions will seasonally promote freezing. The natural freezing process can be coupled with natural evaporative processes to treat oil and gas produced waters year round in regions where subfreezing temperatures seasonally occur. The objectives of this research are related to development of a commercially-economic natural freeze-thaw/evaporation (FTE) process for the treatment and purification of water produced in conjunction with oil and gas.

0209 Environmental Aspects

Refer also to citation(s) 7242

7241 (INIS-mf–15083) **The pre-calculation of ground subsidence due to extraction above petroleum and natural gas deposits.** Mitteilungen aus dem Institut fuer Tiefbohrtechnik, Erdoel- und Erdgasgewinnung (ITE) der Technischen Universitaet Clausthal. Hejmanowski, R. Technische Univ. Clausthal, Clausthal-Zellerfeld (Germany). Inst. fuer Tiefbohrtechnik, Erdoel- und Erdgasgewinnung. Jul 1993. 101p. (In German). Order Number DE95733338. Source: OSTI; NTIS (US Sales Only); INIS.

Extraction from fluid deposits leads to later compaction of the porous supporting rock. The cause of this is a change of pressure in the deposit, which depends on the rate and conditions of extraction. The phenomenon of so-called compaction changes the rock mechanics conditions and causes movements of rock and the ground. Many samples show that considerable damage to extraction plant and bores can be caused by the ground movement. To prevent or to minimize these problems, one can take certain technical measures which must, however, be based on a knowledge of compaction and ground movement. This article examines the effect of compaction on the process of movement at the surface or at the bottom of the sea. A critical analysis of previously known methods of calculation leads to the result that further work on the pre-calculation of compaction and subsidence movements above fluid deposits is necessary. From this, a method of calculation is developed and applied to a large natural gas deposit. (orig.)

0210 Legislation and Regulations

7242 (NYSERDA–94-18) **Reformulated gasoline study, executive summary.** Cunningham, R.E. (Turner, Mason & Co., Dallas, TX (United States)); Michalski, G.W.; Baron, R.E.; Lyons, J.M. New York State Energy Research and Development Authority, Albany, NY (United States); Turner, Mason and Associates, Dallas, TX (United States); DRI/McGraw-Hill, Lexington, MA (United States); Sierra Research, Inc., Sacramento, CA (United States). Oct 1994. 45p. Source: OSTI; New York State Energy Research and Development Authority, Two Rockefeller Plaza, Albany, NY 12223.

The feasibility of adopting alternative standards for reformulated gasoline (RFG) in New York State has been studied for the New York State Energy Research and Development Authority (the Energy Authority). In addition to Federal RFG (EPA 1) and EPA II, California Air Resources Board RFG (CARB 2) and a modified Federal low sulfur RFG (LS-EPA II) were investigated. The effects of these alternative RFGs on petroleum refinery gasoline production costs, gasoline distribution costs, New York State air quality and the New York State economy were considered. New York has already adopted the California low emission vehicle (LEV) and other emission control programs that will affect vehicles and maintenance. From 1998 to 2012 without the introduction of any type of RFG, these programs are estimated to reduce New York State mobile source summer emissions by 341 tons per day (or 40%) of non-methane hydrocarbons (NMHC) and by 292 tons per day (or 28%) of nitrogen oxides (NO_x), and to reduce winter emissions of carbon monoxide (CO) by 3,072 tons per day (or 39%). By 2012, the planned imposition of Federal RFG will produce further reductions (percent of 1998 levels) of 10 %, 4 % and 11%, respectively, for NMHC, NO_x and CO. If New York State goes beyond EPA II and adopts CARB 2 specifications, further reductions achieved in 2012 are estimated to be very small, equaling 2% or less of 1998 levels of NMHC and NO_x emissions, while CO emissions would actually increase by about 2%. When compared to EPA II over the same time frame, LS-EPA II would produce negligible (less than 1%) reductions in each of the above emissions categories.

0220 Transport, Handling, and Storage

7243 (ETDE-DE–10) **Computer assisted diagnostic pig system for preventive damage detection in pipelines.** Mineraloelverbundleitung GmbH Schwedt I.G. (Germany). [1992]. 21p. (In German). Sponsored by Bundesministerium fuer Forschung und Technologie, Bonn (Germany). Foerderkennzeichen BMFT 0327102A. Order Number DE95738903. Source: OSTI; NTIS (US Sales Only).

A diagnostic pig was to be developed for detection of cracks and local corrosion on the inner walls of pipelines for petroleum and petroleum products. This is to facilitate early detection of accident-prove pipeline sectors. (orig.)

7244 (GKSS–94/E/14) **Off-gas purification by means of membrane vapor separation systems.** Ohlrogge, K. (GKSS-Forschungszentrum Geesthacht GmbH (Germany). Inst. fuer Chemie); Wind, J.; Behling, R.D. GKSS-Forschungszentrum Geesthacht GmbH (Germnay). 1994. 15p. (CONF-9310360–2: 8.

symposium on separation science and technology for energy applications, Gatlinburg, TN (United States), 24-28 Oct 1993). Order Number DE95738575. Source: OSTI; NTIS (US Sales Only).

The separation and recovery of volatile hydrocarbon vapors from gasoline tank farm off-gases can in Europe be considered to be a state of the art technology. A new application in the treatment of gasoline vapors is the installation of a membrane module in vapor return lines from petrol dispensers to storage tanks at gasoline stations to enhance in the vapor recovery efficiency of this system. For solvent vapor recovery some membrane systems have been installed in the chemical and pharmaceutical industry. The paper deals with design features and operating experience. (orig.)

7245 (NEI-NO–471) **Structural reliability methods for pipeline design and code calibration.** Sotberg, T. (Stiftelsen for Industriell og Teknisk Forskning (SINTEF), Trondheim (Norway)); Leira, B.J. Norsk Petroleumsforening, Oslo (Norway). 1993. 22p. (CONF-9311279–1: Offshore pipelines, Haugesund (Norway), 30 Nov 1993). Order Number DE95737639. Source: OSTI; NTIS.

The objective of this paper is to illustrate the basic principles, the methodology and the potential with respect to application of structural reliability methods for design of offshore pipelines. The method provides a rational tool to include operational experience and new research findings into the design process. This is achieved by introducing appropriate design criteria which are determined from acceptable safety levels for relevant limiting conditions. Focus is on development of reliability based design criteria as a rational way to manage future offshore projects with an optimal balance between project safety and economy. Finally, some examples of application are given. 16 refs., 5 figs., 9 tabs.

7246 (SAND–94-3093C) **Supai salt karst features: Holbrook Basin, Arizona.** Neal, J.T. Sandia National Labs., Albuquerque, NM (United States). [1994]. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. (CONF-9504100–2: 5. multidisciplinary conference on sinkholes and the engineering and environmental impacts of Karst, Gatlinburg, TN (United States), 1-5 Apr 1995). Order Number DE95004772. Source: OSTI; NTIS; GPO Dep.

More than 300 sinkholes, fissures, depressions, and other collapse features occur along a 70 km (45 mi) dissolution front of the Permian Supai Formation, dipping northward into the Holbrook Basin, also called the Supai Salt Basin. The dissolution front is essentially coincident with the so-called Holbrook Anticline showing local dip reversal; rather than being of tectonic origin, this feature is likely a subsidence-induced monoclinal flexure caused by the northward migrating dissolution front. Three major areas are identified with distinctive attributes: (1) The Sinks, 10 km WNW of Snowflake, containing some 200 sinkholes up to 200 m diameter and 50 m depth, and joint controlled fissures and fissure-sinks; (2) Dry Lake Valley and contiguous areas containing large collapse fissures and sinkholes in jointed Coconino sandstone, some of which drained more than 50 acre-feet ($\sim 6 \times 10^4$ m^3) of water overnight; and (3) the McCauley Sinks, a localized group of about 40 sinkholes 15 km SE of Winslow along Chevelon Creek, some showing essentially rectangular jointing in the surficial Coconino Formation. Similar salt karst features also occur between these three major areas. The range of features in Supai salt are distinctive, yet similar to those in other evaporate basins. The wide variety of dissolution/collapse features range in development from incipient surface expression to mature and old age. The features began forming at least by Pliocene time and continue to the present, with recent changes reportedly observed and verified on airphotos with 20 year repetition. The evaporate sequence along interstate transportation routes creates a strategic location for underground LPG storage in leached caverns. The existing 11 cavern field at Adamana is safely located about 25 miles away from the dissolution front, but further expansion initiatives will require thorough engineering evaluation.

0230 Properties and Composition

Refer also to citation(s) 7128

7247 (DOE/PC/92104–T7) **Advanced thermally stable jet fuels. Technical progress report, January 1994–March 1994.** Schobert, H.H.; Eser, S.; Song, C.; Hatcher, P.G.; Walsh, P.M.; Coleman, M.M. Pennsylvania State Univ., University Park, PA (United States). Coll. of Earth and Mineral Sciences. May 1994. 82p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-92PC92104. Order Number DE95005555. Source: OSTI; NTIS; GPO Dep.

The Penn State program in advanced thermally stable coal-based jet fuels has five broad objectives. First, the development of mechanisms of degradation and solids formation. Second, quantitative measurement of the growth of sub-micrometer and micrometer-sized particles suspended in fuels during thermal stressing will be performed. Third, carbonaceous deposits will be characterized. Fourth, the elucidation of the role of additives in the formation of carbonaceous solids will be investigated. Five, the potential for the production of high yields of cycloalkanes by direct liquefaction of coal will be assessed.

0250 Combustion

Refer also to citation(s) 7955, 7956

03 NATURAL GAS

0302 Reserves, Geology, and Exploration

Refer also to citation(s) 7194, 8649

0303 Drilling, Production, and Processing

Refer also to citation(s) 7546

0304 Products and By-Products

Refer also to citation(s) 7571, 8254

7248 (DOE/PC/92111–T7) **Conversion of light hydrocarbon gases to metal carbides for production of liquid fuels and chemicals. Quarterly technical status report, July 1–September 30, 1994.** Diaz, A.F.; Modestino, A.J.; Pride, J.D.; Howard, J.B.; Tester, J.W.; Peters, W.A. Massachusetts Inst. of Tech., Cambridge, MA (United States). Energy Lab. Nov 1994. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-92PC92111. (FE-MIT–92111-8). Order Number DE95005191. Source: OSTI; NTIS; GPO Dep.

Progress is described on Task 1, Industrial chemistry and applied kinetics of light hydrocarbon gas conversion to metal carbides, hydrogen, and carbon monoxide. Results of three scoping runs with methane and MgO for the synthesis of Mg_2C_3 or MgC_2 are described. Samples were also analyzed for their hydrolysis products (C_3H_4 and C_2H_2). The paper also discusses the upgrading of the design of the plasma reactor used in the research project.

0306 Economic, Industrial, and Business Aspects

Refer also to citation(s) 7233, 7235, 7995

7249 (DOE/EIA–M062/2) **Model documentation natural gas transmission and distribution model (NGTDM) of the national energy modeling system. Volume II: Model developer's report.** USDOE Energy Information Administration, Washington, DC (United States). Office of Integrated Analysis and Forecasting. 3 Jan 1995. 45p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95006079. Source: OSTI; NTIS; GPO Dep.

To partially fulfill the requirements for "Model Acceptance" as stipulated in EIA Standard 91-01-01 (effective February 3, 1991), the Office of Integrated Analysis and Forecasting has conducted tests of the Natural Gas Transmission and Distribution Model (NGTDM) for the specific purpose of validating the forecasting model. This volume of the model documentation presents the results of "one-at-a-time" sensitivity tests conducted in support of this validation effort. The test results are presented in the following forms: (1) Tables of important model outputs for the years 2000

and 2010 are presented with respect to change in each input from the reference case; (2) Tables of percent changes from base case results for the years 2000 and 2010 are presented for important model outputs; (3) Tables of conditional sensitivities (percent change in output/percent change in input) for the years 2000 and 2010 are presented for important model outputs; (4) Finally, graphs presenting the percent change from base case results for each year of the forecast period are presented for selected key outputs. To conduct the sensitivity tests, two main assumptions are made in order to test the performance characteristics of the model itself and facilitate the understanding of the effects of the changes in the key input variables to the model on the selected key output variables: (1) responses to the amount demanded do not occur since there are no feedbacks of inputs from other NEMS models in the stand-alone NGTDM run. (2) All the export and import quantities from and to Canada and Mexico, and liquefied natural gas (LNG) imports and exports are held fixed (i.e., there are no changes in imports and exports between the reference case and the sensitivity cases) throughout the forecast period.

7250 (NEI-NO–470) **The outlook for natural gas in Germany.** Bergmann, B. Ruhrgas AG, Essen (Germany). 1993. 40p. (CONF-9305399–1: 7. European gas conference, Oslo (Norway), 12 May 1993). Order Number DE95737638. Source: OSTI; NTIS; INIS.

In a generally stagnant energy market, gas will be the energy with the highest growth rate in Germany, especially because of its steadily rising shares in the residential and commercial sector. In western Germany there is to be accepted that the demand forecasts, which were raised from one conference to the next, have passed their zenith. Great uncertainty exists as regards the future use of gas for power generation. In the absence of any significant expansion of this market sector, which is considered rather improbable in western Germany, it can be stated that anticipated gas demand up to the year 2005 is already covered by existing import contracts and scheduled domestic production. The picture is completely different in eastern Germany, where a doubling of consumption is quite feasible. To achieve the requisite diversification of supplies, substantial additional imports from western sources will have to be contracted. Russia can and should remain eastern Germany's main supplier in the long run, but Russian deliveries must be placed on a reliable, long-term contractual basis. As far as new gas projects are concerned, deliveries from Norway, to a limited extent from the United Kingdom and above all as part of the new Russian export initiative are under discussion. Generally speaking, transit will be an increasingly significant issue, especially for additional supplies from Russia. The efficiency and reliability of gas marketing companies will become far more important in an environment characterised by growing uncertainties. The reliable customer offering a dependable market outlet will be increasingly sought. With energy prices likely to increase only slightly, the management of uncertainties and the safeguarding of economic driving forces will be the main challenge facing our supply projects. 15 figs.

7251 (PNL-SA–25145) **Tax revenue and innovations in natural gas supply: New Mexico.** Ulibarri, C.A.; Marsh, T.L. Pacific Northwest Lab., Richland, WA (United States). Oct 1994. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-9410270–1: Federation of tax administrators revenue estimating and tax research conference, Albuquerque, NM (United States), 23-26 Oct 1994). Order Number DE95004565. Source: OSTI; NTIS; INIS; GPO Dep.

This paper develops an econometric model of natural gas supply at the state-level using New Mexico as a case study. The supply model is estimated using annual time series observations on production levels, delivered prices, proved reserves, existing wells, and extraction costs. The authors validate the model against historical data and then use it to consider the fiscal impacts on state tax revenue from innovations in extraction technologies.

0308 Environmental Aspects

Refer also to citation(s) 7239, 7241

7252 (GRI–93/0091) **Pipeline corridors through wetlands - impact on plant communities: Mill Creek Tributary Crossing, Jefferson County, New York, 1991 survey. Topical report, June 1991–April 1993.** Van Dyke, G.D. (Argonne National Lab., IL (United States)); Shem, L.M.; Zimmerman, R.E. Gas Research Inst., Chicago, IL (United States). Environment and Safety Research Dept.; Argonne National Lab., IL (United States). Dec 1994. 105p. Sponsored by Gas Research Inst., Chicago, IL (United States). DOE Contract W-31109-ENG-38. Contract 5088-252-1770. Order Number DE95004421. Source: OSTI; NTIS; Gas Research Institute, 8600 West Bryn Mawr Ave., Chicago, IL 60631; GPO Dep.

The goal of the Gas Research Institute Wetland Corridors Program is to document impacts of existing pipelines on the wetlands they traverse. To accomplish this goal, 12 existing wetland crossings were surveyed. These sites varied in elapsed time since pipeline construction, wetland type, pipeline installation techniques, and right-of-way (ROW) management practices. This report presents the results of a survey conducted in June 1991 at the Mill Creek tributary crossing, Jefferson County, New York. One pipeline had been installed through the wetland in 1966, and another was scheduled to be installed later in 1991. Data were collected along the existing pipeline ROW and also along the planned ROW for use as baseline data in future studies. Four separate communities were surveyed. A scrub-shrub wetland and a forested wetland were sampled along the existing ROW where the planned pipeline was to be installed. A mixed vegetation community was sampled along the existing ROW, west of where the planned pipeline would joint the ROW. A marsh community was sampled along the route of the planned pipeline. All plant species found on the ROW of the scrub-shrub community were also present in the adjacent natural areas. The vegetation on the ROW of the forested wetland community also consisted mostly of species found in the adjacent natural areas. In the mixed vegetation community, a small drainage channel present on the ROW, possibly resulting from the pipeline construction, provided habitat for a number of obligate species not found in other areas of this community. Differences noted among different areas of this community were also attributed to slight variations in elevation.

7253 (GRI–93/0229) **Pipeline corridors through wetlands – Impacts on plant communities: Little Timber Creek Crossing, Gloucester County, New Jersey. Topical report, August 1991–January 1993.** Shem, L.M. (Argonne National Lab., IL (United States). Center for Environmental Restoration Systems); Zimmerman, R.E.; Alsum, S.K.; Van Dyke, G.D. Gas Research Inst., Chicago, IL (United States); Argonne National Lab., IL (United States). Dec 1994. 55p. Sponsored by Gas Research Inst., Chicago, IL (United States). DOE Contract W-31-109-ENG-38. Contract 5088-252-1770. Order Number DE95005047. Source: OSTI; NTIS; INIS; GPO Dep.

The goal of the Gas Research Institute Wetland Corridors Program is to document impacts of existing pipelines on the wetlands they traverse. To accomplish this goal, 12 existing wetland crossings were surveyed. These sites varied in elapsed time since pipeline construction, wetland type, pipeline installation techniques, and right-of-way (ROW) management practices. This report presents results of a survey conducted over the period of August 5–7, 1991, at the Little Timber Creek crossing in Gloucester County, New Jersey, where three pipelines, constructed in 1950, 1960, and 1990, cross the creek and associated wetlands. The old side of the ROW, created by the installation of the 1960 pipeline, was designed to contain a raised peat bed over the 1950 pipeline and an open-water ditch over the 1960 pipeline. The new portion of the ROW, created by installation of the 1990 pipeline, has an open-water ditch over the pipeline (resulting from settling of the backfill) and a raised peat bed (resulting from rebound of compacted peat). Both the old and new ROWs contain dense stands of herbs; the vegetation on the old ROW was more similar to that in the adjacent natural area than was vegetation in the new ROW. The ROW increased species and habitat diversity in the wetlands. It may contribute to the spread of purple loosestrife and affect species sensitive to habitat fragmentation.

7254 (GRI–94/0035) **Pipeline corridors through wetlands – Impacts on plant communities: Norris Brook Crossing**

Peabody, Massachusetts. Shem, L.M. (Argonne National Lab., IL (United States)); Van Dyke, G.D.; Zimmerman, R.E. Gas Research Inst., Chicago, IL (United States). Environment and Safety Research Group; Argonne National Lab., IL (United States). Dec 1994. 49p. Sponsored by Gas Research Inst., Chicago, IL (United States). Contract 5088-252-1770. Source: OSTI; Gas Research Institute, 8600 West Bryn Mawr Ave., Chicago, IL 60631 (United States).

The goal of the Gas Research Institute Wetland Corridors Program is to document impacts of existing pipelines on the wetlands they traverse. To accomplish this goal, 12 existing wetland crossings were surveyed. These sites varied in elapsed time since pipeline construction, wetland type, pipeline installation techniques, and right-of-way (ROW) management practices. This report presents the results of a survey conducted August 17–19, 1992, at the Norris Brook crossing in the town of Peabody, Essex County, Massachusetts. The pipeline at this site was installed during September and October 1990. A backhoe was used to install the pipeline. The pipe was assembled on the adjacent upland and slid into the trench, after which the backhoe was used again to fill the trench and cover the pipeline. Within two years after pipeline construction, a dense vegetative community, composed predominantly of native perennial species, had become established on the ROW. Compared with adjacent natural areas undisturbed by pipeline installation, there was an increase in purple loosestrife and cattail within the ROW, while large woody species were excluded from the ROW. As a result of the ROW's presence, habitat diversity, edge-type habitat, and species diversity increased within the site. Crooked-stem aster, Aster prenanthoides (a species on the Massasschusetts list of plants of special concern), occurred in low numbers in the adjacent natural areas and had reinvaded the ROW in low numbers.

0320 Transport, Handling, and Storage

Refer also to citation(s) 7245, 7253

7255 (NEI-DK–1810) **Rehabilitation of two gas pipes crossing the river Nemunas in Kaunas, Lithuania. Final report.** Carl Bro A/S, Glostrup (Denmark); Carl Bro Gruppen, Glostrup (Denmark). Dec 1994. 36p. Order Number DE95737583. Source: OSTI; NTIS.

Kauno Dujos, Kaunas Gas, is supplying natural gas to a domestic market including a number of industrial consumers. At the appraisal stage of this project, the natural gas supply system in Kaunas was suffering from insufficient supply capacity. One of the reasons for the problems occurred was that severe corrosion in some of the old steel gas pipe system caused leakages. The objective for the projects is to restore natural gas supply in river crossing no. 3 and then increase the supply for industries and residential housing. Furthermore it is an objective to improve the security of supply in case of necessary disconnections of other main pipes, due to leakages or other events. The present project has been suggested by the Lithuanian authorities in October 1992 for financing under the Danish 'InterMinisterielle Oestlandepulje'-funds under the Lithuanian - Danish governmental negotiations. The two pipes were rehabilitated on 4-5 November 1994. Kaunas Gas has subsequently made the 'tie-in' connections to the existing gas networks, so that gas supply in the two rehabilitated pipes was restored. At present the final documentation is being assembled by the contractor for the client's and the Recipient's final approval. Provisional approvals have, however, been collected from the involved parties. (EG)

7256 (STUDSVIK-M–94-61) **EVOPE - Evaluation of polyethylene pipes for gas distribution. Final report.** Traenkner, T.; Ifwarson, M. Studsvik Material AB, Nykoeping (Sweden). May 1994. 35p. (In Swedish). Project SGC-91-10. Order Number DE95737679. Source: OSTI; NTIS.

Results are presented from an international collaboration project called EVOPE. The aim of the work was to develop a lifetime model for PE-gas pipes. The lifetime of a plastic pipe depends on material, environmental and loading factors. Plastic pipes are exposed to chemical and mechanical degradation. The EVOPE project deals with the mechanical failure mechanisms exclusively since chemical degradation is not a matter of concern during normal service conditions. According to field failure statistics from France and the United States, 84% of all field failures occurred in welds in PE-gas pipes. In general rapid crack propagation is favoured by large pipe diameters, large wall thickness, low temperature and high internal overpressure. Slow crack growth (SCG) is the predominant failure mechanism for brittle long term failures. The SCG-testing with notched specimens was done using dead loaded notched specimens or notched pipe specimens with a constant internal overpressure. Data show that SCG testing with notched specimens reduces the time to brittle failure twenty times compared to hydrostatic pressure testing of un-notched pipes if the specimens are not chemically degraded during testing. Lifetime estimation was possible within a testing time of 30-6000 h (depending on the pipe material) by using SCG-testing at 80 degrees C in air. Of the three resins investigated within EVOPE the Swedish gas pipe material had the longest failure time at 80 degrees C in air. SCG testing is a good method for lifetime estimation and ranking of different PE-materials. 19 refs, 18 figs, 8 tabs

0340 Combustion

Refer also to citation(s) 7172, 7639, 8266

7257 (DOE/MT/94011–1) **Study of the effects of ambient conditions upon the performance of fan powered, infrared, natural gas burners. Quarterly technical progress report, September 1–September 30, 1994.** Bai, T. Clark Atlanta Univ., GA (United States). Dept. of Engineering. Oct 1994. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-94MT94011. Order Number DE95005306. Source: OSTI; NTIS; GPO Dep.

The objective of this investigation is to characterize the operation of fan powered infrared(PIR) burner at various barometric pressures (operating altitude) and gas compositions and develop design guidelines for appliances containing PIR burners for satisfactory performance. In this program, the theoretical basis for the behavior of PIR burners will be established through analysis of the combustion, heat and mass transfer, and other related processes which determine the performance of PIR burners. Based on the results of this study, a first order model of the performance of the burner, including radiant output will be developed. The model will be applied to predict the performance of the selected burner and modified through comparison with test results. Concurrently, an experimental setup will be devised and built. This experimental rig will be a modified appliance, capable of measuring the heat and combustion product output, as well as providing a means by which the radiant heat output can be measured. The burner will be selected from an existing commercial appliance, a commercial deep fat fryer, and will be of a scale that will be compatible with the laboratory facilities in the Combustion Laboratory at Clark Atlanta University. Theoretical analysis and formulation of the PIR burner performance model has been started and the development of the test facilities and experimental setup has also been initiated. These are described.

7258 (KE–93005G) **Development of an energy efficient industrial gas combustion system.** Noh, D.S. (Korea Institute of Energy Research, Taejon (Korea, Republic of)); Kim, W.B.; Dong, S.K.; Yang, J.B.; Lee, E.K. No corporate text available. Dec 1993. 120p. (In Korean). Order Number DE95744264. Source: OSTI; NTIS (US Sales Only).

A new technical approach is necessary to increase not only energy efficiency, productivity and product quality but also reduction of NOx formation in industrial processes. The aim of the study was to develope an energy efficient industrial gas burner which meet the above requirements. The works were concentrated on the surface combustion using a metallic fiber mat as a burner material. The first year studies included fabrication method and combustion tests for low/high load gas burner. A relatively low NOx, stable combustion and uniform surface radiation characteristics were confirmed. (author). refs., figs., tabs.

7259 **Method of and system for producing electrical power.** Carabetta, R.A.; Staats, G.E.; Cutting, J.C. To Dept. of

Energy. 1992. Filed date 8 Dec 1992. U.S. Patent Application 7-986,828. 26p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95006118. Source: OSTI; NTIS (US Sales Only); GPO Dep.

This invention is comprised of a method and system for converting the chemical energy of methane to electrical energy. Methane is thermally decomposed to hydrogen and carbon in a decomposing unit at a temperature not less than about 1200°K and at a pressure at least slightly above atmospheric pressure. Carbon and substantially pure oxygen and a cesium or potassium seed material is transmitted to a combustor which is maintained at a pressure of at least about 50 atmospheres to combust the carbon and oxygen and provide an ionized plasma having a temperature not less than about 2800°K. The ionized plasma is accelerated to a velocity not less than about 1000 m/sec and transported through an MHD generator having a magnetic field in the range of from about 4 to about 6 Tesla to generate dc power. The ionized plasma is decelerated and passed from the MHD generator in heat exchange relationship with the methane to heat same for decomposition and or reaction, and thereafter any cesium or potassium seed material is recovered and transported to the combustor, and the dc power from the MHD generator is converted to ac power.

05 NUCLEAR FUELS

7260 (WSRC-TR–94-100-6) **Savannah River Technology Center monthly report: June 1994.** Westinghouse Savannah River Co., Aiken, SC (United States). Jun 1994. 33p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE95005008. Source: OSTI; NTIS; GPO Dep.

Short summaries are given for 53 projects concerned with tritium, separations, environmental, waste management and general topics. Included in the general topics are the following: High-level waste integrated flowsheet model; Scoping thermal analysis of failed equipment storage vault thermal model; Decision support system for in-tank precipitation benzene stripper experiment; Development of a liquid level bubbler for Defense Waste Processing Facility canyon vessels; Thermal testing of 9973 and 9975 series packagings; and Technical review of CD-1 cask for first time use.

7261 (WSRC-TR–94-100-8) **Savannah River Technology Center monthly report: August 1994.** Westinghouse Savannah River Co., Aiken, SC (United States). Aug 1994. 24p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE95005014. Source: OSTI; NTIS; GPO Dep.

Short summaries are given for 45 projects concerned with tritium, separations, environmental, and general topics. Included in the general topics are the following: Burst test qualification analysis of Defense Waste Processing Facility canister-plug weld; Design and development of sampling plans for non-radioactive hazardous waste; Thermal fluids laboratory melter feed test; FRR spent fuel dry storage development; SRTC buildings fire hazards analysis; and SRTC plutonium vulnerability study.

0501 Reserves, Exploration, and Mining

Refer also to citation(s) 8453

7262 (IAEA-R–6773-F) **Application of gas geochemistry in the search for different types of uranium deposits. Final report for the period 15 November 1991 - 15 March 1994.** Chen Guoliang (Beijing Research Inst. of Uranium Geology (BRIUG), Beijing (China)). International Atomic Energy Agency, Vienna (Austria). Oct 1994. 58p. Order Number DE95615481. Source: OSTI; NTIS (US Sales Only); INIS.

This paper presents the study of primary and secondary gas halo and application in the search for different types of uranium deposits in China. Through measuring Rn, CO_2, O_2 and Hg in various deposits of geographical and climatic conditions for the gas geochemical survey. Three comprehensive measuring methods of CO_2, Rn and 0_2 were thought to be optimum for gas geochemical exploration because of its portability, rapidity, low cost, simple operation and limited interference. Our experimental data can be briefly summarized that higher concentration of CO_2, Rn and lower concentration of secondary halo in soil show blinded deposits. Our project have finished the study of thermal emanating gas in soil and rock. The methods were confirmed by known deposits and can be used in uranium exploration or environment investigation. 4 refs, 23 figs, 26 tabs.

0504 Feed Processing

7263 (LA–12909-MS) **Thermodynamic modeling of hydrogen fluoride production relevant to actinide residue treatment.** West, M.H.; Axler, K.M. Los Alamos National Lab., NM (United States). Feb 1995. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. Order Number DE95005914. Source: OSTI; NTIS; GPO Dep.

This report addresses issues specific to generation of hydrogen fluoride via reaction of calcium fluoride with sulfuric acid. This process has been established on a commercial scale and is under consideration for treatment of calcium fluoride residues from uranium processing. Magnesium fluoride slags are also available as a product of uranium processing. The technique of using sulfuric acid for the production of hydrogen fluoride from magnesium fluoride is also under consideration as a residue processing scheme. In the current study, thermodynamic modeling was used to investigate these chemical processing systems. Results presented herein reveal information relevant to selection of processing temperatures and conditions. Details include predicted effects in system composition based on operating temperatures for both the calcium fluoride and the magnesium fluoride systems.

0507 Fuels Production and Properties

Refer also to citation(s) 7263, 7368, 7704

0508 Spent Fuels Reprocessing

Refer also to citation(s) 7279, 7469, 7492, 7702, 8246

7264 (FRCEA-TH–412) **Application of active neutronic interrogation method to the line analysis in reprocessing plant.** Passard, C. CEA Centre d'Etudes de Cadarache, 13 - Saint-Paul-lez-Durance (France). Dept. d'Etudes des Reacteurs; Grenoble-1 Univ., 38 (France). 12 Feb 1993. 308p. (In French). Order Number DE95612016. Source: OSTI; NTIS (US Sales Only); INIS.

In a reprocessing plant of irradiated spent fuels, the knowledge in real time (line analysis) of uranium and plutonium quantities present in solutions is an extremely important parameter to control the proceeding and for the apparatus safety. The active neutronic analysis give a nondestructive non intrusive and quick measure to know the concentrations. This method consists in inducing fissions in nuclides with a neutron source and then to detect the particles which come from.

7265 (IAEA-TECDOC–765) **Problems concerning the accumulation of separated plutonium. Report of an advisory group meeting held in Vienna, 26-29 April 1993.** International Atomic Energy Agency, Vienna (Austria). Sep 1994. 69p. (CONF-9304279–: Advisory group meeting on problems concerning the accumulation of separated plutonium, Vienna (Austria), 26-29 Apr 1993). Order Number DE95612017. Source: OSTI; NTIS (US Sales Only); INIS.

Due to the delays worldwide in the development and starting up of fast breeder reactors (which require large amounts of plutonium at startup) and the ongoing reprocessing of spent fuel (which produces separated plutonium), significant quantities of separated plutonium are being created. An Advisory Group meeting was held in April 1993 to consider this situation. The meeting had two primary objectives: to determine the magnitude of the plutonium accumulations and to identify potential problems related to this accumulation of separated plutonium. In this document IAEA estimates of present and projected inventories of separated plutonium are presented and discussed. Document also contains presentations from representatives of Member States on national

programmes for production and utilization of separated plutonium. Refs, figs and tabs.

7266 (IAEA-TECDOC–765, pp. 13-14) **China's nuclear power programme and the projected production and consumption of plutonium.** Liu Qiusheng (Beijing Inst. of Nuclear Engineering, BJ (China)). International Atomic Energy Agency, Vienna (Austria). Sep 1994. (CONF-9304279–: Advisory group meeting on problems concerning the accumulation of separated plutonium, Vienna (Austria), 26-29 Apr 1993). In *Problems concerning the accumulation of separated plutonium. Report of an advisory group meeting held in Vienna, 26-29 April 1993.* 69p. Order Number DE95612017. Source: OSTI; NTIS (US Sales Only); INIS.

China's nuclear power programme is described. All of China's spent fuel will be reprocessed. Primary use of the plutonium recovered will be fast breeder reactors. (author). 1 tab.

7267 (IAEA-TECDOC–765, pp. 15-25) **Industrial reprocessing and recycling in France: An effective plutonium management method.** Gerster, D. (CEA Centre d'Etudes de Saclay, 91 - Gif-sur-Yvette (France). Direction du Cycle du Combustible); Longevialle, H. de; Lucas, P. International Atomic Energy Agency, Vienna (Austria). Sep 1994. (CONF-9304279–: Advisory group meeting on problems concerning the accumulation of separated plutonium, Vienna (Austria), 26-29 Apr 1993). In *Problems concerning the accumulation of separated plutonium. Report of an advisory group meeting held in Vienna, 26-29 April 1993.* 69p. Order Number DE95612017. Source: OSTI; NTIS (US Sales Only); INIS.

The paper describes the commercial facilities required for plutonium recycling. It presents the status of the French plutonium fuel cycle facilities in operation or under construction, including the quantities of materials treated to date and the current and anticipated capacity for the coming years. The French policy on plutonium management, including loading uranium oxide and uranium-plutonium oxide fuels in light water reactors over the coming years, is also described. Finally, French research and development relating to plutonium management, particularly with respect to advanced reactors, is presented. (author). 2 figs, 4 tabs.

7268 (IAEA-TECDOC–765, pp. 27-28) **Problems concerning the accumulation of isolated plutonium - Situation in Germany.** Schmidt, U. (Siemens AG, Hanau (Germany). Power Generation Group KWU). International Atomic Energy Agency, Vienna (Austria). Sep 1994. (CONF-9304279–: Advisory group meeting on problems concerning the accumulation of separated plutonium, Vienna (Austria), 26-29 Apr 1993). In *Problems concerning the accumulation of separated plutonium. Report of an advisory group meeting held in Vienna, 26-29 April 1993.* 69p. Order Number DE95612017. Source: OSTI; NTIS (US Sales Only); INIS.

Germany is committed to spent fuel reprocessing, plutonium recovery and recycling. The total present (end of 1992) separated plutonium inventory is 7.8 tonnes. (author).

7269 (IAEA-TECDOC–765, pp. 29-33) **The role of plutonium in the nuclear power programme of India.** Sood, D.D. (Bhabha Atomic Research Centre, Bombay (India). Radiochemistry and Isotope Group). International Atomic Energy Agency, Vienna (Austria). Sep 1994. (CONF-9304279–: Advisory group meeting on problems concerning the accumulation of separated plutonium, Vienna (Austria), 26-29 Apr 1993). In *Problems concerning the accumulation of separated plutonium. Report of an advisory group meeting held in Vienna, 26-29 April 1993.* 69p. Order Number DE95612017. Source: OSTI; NTIS (US Sales Only); INIS.

India's nuclear power programme is entirely self-reliant, including plutonium recycle. Although the first power plants were BWRs, the primary reactor type is now the PHWR utilizing natural uranium. The long range programme anticipates the use of FBRs. Most of India's plutonium is not separated and remains in spent fuel. Plutonium is utilized shortly after separation; no long term plutonium storage is planned. (author). 3 tabs.

7270 (IAEA-TECDOC–765, pp. 35-43) **The necessity for and significance of nuclear fuel recycling in Japan.** Nakada, M. (Science and Technology Agency, Tokyo (Japan). Nuclear Fuel Div.). International Atomic Energy Agency, Vienna (Austria). Sep 1994. (CONF-9304279–: Advisory group meeting on problems concerning the accumulation of separated plutonium, Vienna (Austria), 26-29 Apr 1993). In *Problems concerning the accumulation of separated plutonium. Report of an advisory group meeting held in Vienna, 26-29 April 1993.* 69p. Order Number DE95612017. Source: OSTI; NTIS (US Sales Only); INIS.

Japan's nuclear program, of necessity, includes fuel reprocessing and recycling of uranium and plutonium for several reasons; Japan lacks natural resources and recycling utilizes resources more efficiently, the environmental impact is reduced and waste disposal problems are reduced. Japan is strongly committed to nuclear non-proliferation and will not possess plutonium (a militarily sensitive material) in amounts greater than required for its fuel cycle program. Japan has submitted to full scope safeguards and supports efforts to improve safeguards effectiveness. Japan's plutonium recycle program will focus first on FBRs then on LWRs and ATR. To gain a greater degree of acceptance both domestically and abroad Japan will endeavour to provide greater openness and transparence throughout its nuclear program. Japan's plutonium recycling programme will consume 80 to 90 tonnes of fissile plutonium by 2010. (author).

7271 (IAEA-TECDOC–765, pp. 45-51) **Russian prospects for plutonium accumulation and utilization.** Kudriavtsev, E.G. (Ministry of Atomic Energy of the Russian Federation, Moscow (Russian Federation)). International Atomic Energy Agency, Vienna (Austria). Sep 1994. (CONF-9304279–: Advisory group meeting on problems concerning the accumulation of separated plutonium, Vienna (Austria), 26-29 Apr 1993). In *Problems concerning the accumulation of separated plutonium. Report of an advisory group meeting held in Vienna, 26-29 April 1993.* 69p. Order Number DE95612017. Source: OSTI; NTIS (US Sales Only); INIS.

Russia now has 20 GW of installed nuclear capacity (vs 36.4 GW in the former USSR). Stagnation in the Russian nuclear industry has delayed many programmes. Russia believes a closed fuel cycle to be the most economical - but continued low uranium prices and buildup of separated plutonium raise questions. Projected separated plutonium inventories vary greatly, depending on assumed reprocessing rates and BN-800 plutonium utilization rates. The start-up of RT-2 in 2002-2005 will increase plutonium annual separation rate by 3.2 tonnes. Nearly all of the nuclear scientists and engineers of the former USSR now resides in Russia. Utilization of plutonium in thermal reactors could be speeded up by international technical co-operation. (author). 4 tabs.

7272 (IAEA-TECDOC–765, pp. 53-57) **Utilization in BN-800 fast reactors of isolated plutonium being accumulated in the Russian Federation.** Kagramanyan, V.S. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk (Russian Federation). Fiziko-Ehnergeticheskij Inst.). International Atomic Energy Agency, Vienna (Austria). Sep 1994. (CONF-9304279–: Advisory group meeting on problems concerning the accumulation of separated plutonium, Vienna (Austria), 26-29 Apr 1993). In *Problems concerning the accumulation of separated plutonium. Report of an advisory group meeting held in Vienna, 26-29 April 1993.* 69p. Order Number DE95612017. Source: OSTI; NTIS (US Sales Only); INIS.

The Russian Federation has presently an inventory of about 26 tonnes of civil separated plutonium, with an annual production rate of 2.5 tonnes. When RT-2 reprocessing plant starts in 2005, the annual production will increase. In addition 50-100 tonnes of plutonium are expected to be released from nuclear weapons. The first BN-800 reactor is supposed to be finished by 2000. Three more BN-800 units are expected to be introduced by 2005. These four units will consume all plutonium inventories. Use in fast reactors is preferred since Thermal reactor utilization does not efficiently utilize the energy content - particularly of the weapon material. (author). 3 refs, 2 figs.

7273 (IAEA-TECDOC–765, pp. 59-61) **Problems concerning the accumulation of isolated plutonium - The Swiss situation.** Bay, H. (Nordostschweizerische Kraftwerke AG, Baden (Switzerland)). International Atomic Energy Agency, Vienna (Austria). Sep 1994. (CONF-9304279–: Advisory group meeting on problems concerning the accumulation of separated plutonium,

Vienna (Austria), 26-29 Apr 1993). In *Problems concerning the accumulation of separated plutonium. Report of an advisory group meeting held in Vienna, 26-29 April 1993.* 69p. Order Number DE95612017. Source: OSTI; NTIS (US Sales Only); INIS.

At present Switzerland has only kilogram quantities of separated plutonium domestically. Contracts for reprocessing spent fuel with COGEMA and BNFL will result in 6.2 tonnes of fissile plutonium prior to 2004. All this plutonium will be consumed by Swiss utilities as MOX. The inventory of separated Swiss plutonium will never exceed 0.6 tonnes. The greatest uncertainty in the Swiss plutonium utilization programme results from delays in approval from the US DOE for proceeding with spent nuclear fuel subject to prior consent rights. (author). 2 figs.

7274 (IAEA-TECDOC–765, pp. 63-65) **Plutonium arisings and utilization in the United Kingdom.** Dodds, R. (British Nuclear Fuels plc, Risley (United Kingdom). THORP Div.). International Atomic Energy Agency, Vienna (Austria). Sep 1994. (CONF-9304279–: Advisory group meeting on problems concerning the accumulation of separated plutonium, Vienna (Austria), 26-29 Apr 1993). In *Problems concerning the accumulation of separated plutonium. Report of an advisory group meeting held in Vienna, 26-29 April 1993.* 69p. Order Number DE95612017. Source: OSTI; NTIS (US Sales Only); INIS.

The UK has presently 11.1 GW installed nuclear generating capacity with an additional 1.2 GW under construction. Plutonium is separated domestically at Sellafield and will be separated for both domestic and foreign customers in the THORP facility which is now complete but not yet in operation. Current stocks of separated plutonium at Sellafield are 35 tonnes. Total plutonium arisings from AGR fuel will be 58 t; 15 t additional plutonium will come from LWR fuel reprocessed at THORP. Plutonium will be utilized in LWRs since fast reactor deployment has been delayed till after 2030, and there is no incentive to use plutonium in AGRs which require only low enrichment fuels. (author).

7275 (IAEA-TECDOC–766, pp. 45-50) **Operational safety in plutonium processing workshops at the La Hague site.** Mathieu, P. (Compagnie Generale des Matieres Nucleaires (COGEMA), Beaumont Hague (France)). International Atomic Energy Agency, Vienna (Austria). Oct 1994. (CONF-9310405–: Technical committee meeting on safe handling, transport and storage of plutonium, Vienna (Austria), 18-21 Oct 1993). In *Safe handling, transport and storage of plutonium. Proceedings of a technical committee meeting held in Vienna, 18-21 October 1993.* 120p. Order Number DE95614900. Source: OSTI; NTIS (US Sales Only); INIS.

To keep under control the nuclear and non-nuclear hazards of plutonium treatment and handling, and to implement the corporate policy to reduce the doses to personnel in compliance with ALARA, it has been necessary to document operating rules. They take into account the following items: Operation of the facility: The facility is operated in compliance with documents containing both operating instructions and definition of the limits of the normal operation area (including the evolution of the operating parameters). A method to manage the non-conformities with those requirements is always implemented when a barrier of the authorized area has been passed. Each member of the operating team is trained and the documents are explained. Maintenance and periodic survey: The good operation of the facility requires to implement maintenance and survey plans, complemented with the experience got back during operation. The periodic cleaning of the enclosures containing plutonium is an example of an item of those plans. Plant modification and refurbishment: From design to decommissioning, the facility has to be improved and enhanced. All the plans for that purpose are checked before implementation in order to verify that the safety of the workshop is by no means weakened, and that no unexpected hazard is to take place during the completion of the work. From the beginning of the project a dosimetric target is assigned. After completion of the work, the target is compared with the cumulated dose of the project, in order to find out the appropriate conclusions. The implementation of that method in our plutonium treatment facilities has provided quite good results concerning both doses to personnel and operation safety. (author).

7276 (IAEA-TECDOC–766, pp. 69-76) **Criticality accidents and simplified estimation of total fission number.** Nomura, Y. (Japan Atomic Energy Research Inst., Tokai, Ibaraki (Japan). Dept. of Fuel Cycle Safety Research); Okuno, H. International Atomic Energy Agency, Vienna (Austria). Oct 1994. (CONF-9310405–: Technical committee meeting on safe handling, transport and storage of plutonium, Vienna (Austria), 18-21 Oct 1993). In *Safe handling, transport and storage of plutonium. Proceedings of a technical committee meeting held in Vienna, 18-21 October 1993.* 120p. Order Number DE95614900. Source: OSTI; NTIS (US Sales Only); INIS.

For a safety assessment of nuclear fuel facilities such as for reprocessing, handling, storage and transportation, one needs to know the scale of criticality accidents, assumed to occur in uranium or plutonium fissile systems. In this paper, noticeable characteristics of the criticality accidents are discussed, and then a simplified evaluation model for predicting the scale, i.e., the number of total fissions in the accidents is derived theoretically by using one point adiabatic reactivity balance model. This model is subsequently validated through the comparison with the transient experiments and the actual accident data reported so far in American and European countries. Some conventional simplified evaluation models are quoted to emphasize the convenience of the proposed model having less constriction in application. (author). 9 refs, 2 figs.

7277 (IAEA-TECDOC–766, pp. 87-94) **Plutonium production and storage at BNFL Sellafield, United Kingdom.** Leigh, B. (British Nuclear Fuels plc, Sellafield (United Kingdom)). International Atomic Energy Agency, Vienna (Austria). Oct 1994. (CONF-9310405–: Technical committee meeting on safe handling, transport and storage of plutonium, Vienna (Austria), 18-21 Oct 1993). In *Safe handling, transport and storage of plutonium. Proceedings of a technical committee meeting held in Vienna, 18-21 October 1993.* 120p. Order Number DE95614900. Source: OSTI; NTIS (US Sales Only); INIS.

Plutonium has been safely produced and stored at BNFL Sellafield for over 40 years. Although the basic chemical processes have not significantly changed throughout that time, the designs of the plants and stores have continuously improved to meet increased capacity requirements and more demanding safety standards for plant operators and the public. Features of the plants that have evolved included those addressing external radiation, containment, criticality, liquid effluent and ventilation and aerial effluent. Examples of these changes will be described and their current status discussed, illustrating how the modern currently operating plants and stores incorporate multiple diverse and redundant features to ensure safety under normal and fault conditions. As well as some reference to design standards and codes of practice, comments will be made on the procedures by which the safety of the operating plant may be demonstrated to both BNFL and the regulatory authorities. These include continuous review and audit together with hazard and probabilistic risk assessments. In addition to considering the currently operating plants, some reference will also be made to future plants, primarily the THORP facility, to illustrate the continuing evolution of the plants. The paper will thus present and overview, supported by specific examples, of the development and safe operation of a large scale plutonium finishing plant and storage facility. (author).

7278 **Process to remove rare earth from IFR electrolyte.** Ackerman, J.P.; Johnson, T.R. To Dept. of Energy. 1992. Filed date 31 Dec 1992. U.S. Patent Application 7-999,339. 22p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31-109-ENG-38. Order Number DE95006112. Source: OSTI; NTIS (US Sales Only); GPO Dep.

The invention is a process for the removal of rare earths from molten chloride electrolyte salts used in the reprocessing of integrated fast reactor fuel (IFR). The process can be used either continuously during normal operation of the electrorefiner or as a batch process. The process consists of first separating the actinide values from the salt before purification by removal of the rare earths. After replacement of the actinides removed in the first step, the now-purified salt electrolyte has the same uranium and plutonium concentration and ratio as when the salt was removed from the electrorefiner.

0509 Transport, Handling, and Storage

Refer also to citation(s) 7272, 7277, 7372, 7469, 7496, 7497, 7513, 7702, 8245, 8636

7279 (IAEA-TECDOC–766, pp. 29-43) **French engineering design rules for safe handling and storage of plutonium.** Drain, F. (Societe Generale pour les Techniques Nouvelles (SGN), 78 - Saint-Quentin-en-Yvelines (France)); Bertolotti, G. International Atomic Energy Agency, Vienna (Austria). Oct 1994. (CONF-9310405–: Technical committee meeting on safe handling, transport and storage of plutonium, Vienna (Austria), 18-21 Oct 1993). In *Safe handling, transport and storage of plutonium. Proceedings of a technical committee meeting held in Vienna, 18-21 October 1993.* 120p. Order Number DE95614900. Source: OSTI; NTIS (US Sales Only); INIS.

This paper introduces the principles and rules applied currently in France for design and construction of the part of reprocessing plant where plutonium is handled. The following fields are reviewed: containment consists in successive barriers between radioactive materials, workers and environment. Their efficiency is continuously monitored; ventilation of process equipment and surrounding cells and rooms: contaminated gas release is prevented by keeping a negative pressure cascade and by appropriate gas treatment; these treatments are defined according to family classification corresponding to level of contamination risk; radiation control: plant is zoned in view of protection against radiation. Monitoring system enables to evaluate the exposure level of personnel and to control their environment; criticality: safety analysis has to demonstrate that criticality cannot result of a single failure. In most of the case, criticality safety is ensured by geometry; fire risks are minimized by prevention (choice of equipment and operating conditions), by early detection system and automatic extinction system and by protection such as specific room classification and implementation of fire breaks; specific analysis and subsequent measures are taken to prevent explosion risks linked for instance to use of solvent, or presence of hydrogen due to radiolysis; cooling of high concentrated Pu solution and equipment containing PuO_2 is provided; solid and liquid wastes: their production is minimized thanks to an appropriate wastes management and to efficient decontamination processes. The application of these rules to the new Pu facilities of La Hague allows to ensure safety of operation, efficiency of the process, significant reduction of dose rate to personnel and decrease of volume of wastes to be stored and of effluents discharged to the environment. (author). 1 tab.

7280 (IAEA-TECDOC–766, pp. 51-68) **Safety of plutonium shipments in and from France.** Renard, C. (CEA Centre d'Etudes de Fontenay-aux-Roses, 92 (France). Inst. de Protection et de Surete Nucleaire); Mathieu, F.; Desnoyers, B.; Malesys, P. International Atomic Energy Agency, Vienna (Austria). Oct 1994. (CONF-9310405–: Technical committee meeting on safe handling, transport and storage of plutonium, Vienna (Austria), 18-21 Oct 1993). In *Safe handling, transport and storage of plutonium. Proceedings of a technical committee meeting held in Vienna, 18-21 October 1993.* 120p. Order Number DE95614900. Source: OSTI; NTIS (US Sales Only); INIS.

Plutonium extracted from irradiated fuel at reprocessing plants is used in the manufacture of fresh fuel for light water reactors (MOX) or fast breeder reactors. Consequently various forms of plutonium have to be transported in France and between France and other countries. In 1945 France adopted a regulation for the safe transport of dangerous goods (RTMD) which was revised most recently in 1992. This regulation complies with international rules for the land transport of dangerous goods in Europe which take into account the recommendations of the IAEA for the safe transport of radioactive materials. For other shipment modes (by air and sea), France adopts directly applicable international regulations which also take into account the IAEA regulations. To meet these regulations safety is usually provided by the package, independent of the transport mode employed. Even for transport of a few grams, packages used for plutonium dioxide must be of the most stringent type design TYPE B/F. For this type of package, IAEA defines requirements corresponding with normal and accidental situations. Different packages have been developed and are used in France for the transport of material containing plutonium. In France, the competent authority for the transport of dangerous goods is the Ministry of Transport which relies on the IPSN. However, other ministries do also provide prominent roles, particularly for the case of accidents on public thoroughfares: Ministry of Interior, of Health, of Industry. In the case of abnormal situations arising during the transport of radioactive materials, special procedures can be applied: National intervention plans (PSS/TMR, NUCMAR); the transporters own emergency plans (PLUT). Each of these items are discussed in the paper. 9 refs, 8 figs.

7281 (IAEA-TECDOC–766, pp. 109-117) **Plutonium transport: The UK experience - 35 years on.** Carr, M. (British Nuclear Fuels plc, Risley (United Kingdom). Engineering and Technical Services). International Atomic Energy Agency, Vienna (Austria). Oct 1994. (CONF-9310405–: Technical committee meeting on safe handling, transport and storage of plutonium, Vienna (Austria), 18-21 Oct 1993). In *Safe handling, transport and storage of plutonium. Proceedings of a technical committee meeting held in Vienna, 18-21 October 1993.* 120p. Order Number DE95614900. Source: OSTI; NTIS (US Sales Only); INIS.

Plutonium transport dates back to the beginning of the nuclear industry in the United Kingdom. Advances in regulatory processes and the development of nuclear plants has led to an internationalisation of nuclear transport. The United Kingdom, as an island, has had to develop transport packaging and systems to meet this challenge. The safety of the transport is vested in the packaging but the mode of transport cannot be ignored, safety and security go hand-in-hand where international consignments are concerned. Fuel assemblies have posed further considerations of fuel integrity and vibration control to be taken into account and the applicability of current modes of transport and assets have to be examined against these requirements. The regulatory process continues and imposes yet further constraints on these transports which have to be considered and solutions found. Despite these problems, BNFL continues to be committed to the continuation of such transports finding safe, secure and cost effective solutions. (author). 6 refs.

7282 (ORNL/M–3077) **Transportation and packaging resource guide.** Arendt, J.W.; Gove, R.M.; Welch, M.J. Oak Ridge National Lab., TN (United States). Dec 1994. 133p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE95004881. Source: OSTI; NTIS; INIS; GPO Dep.

The purpose of this resource guide is to provide a convenient reference document of information that may be useful to the U.S. Department of Energy (DOE) and DOE contractor personnel involved in packaging and transportation activities. An attempt has been made to present the terminology of DOE community usage as it currently exists. DOE's mission is changing with emphasis on environmental cleanup. The terminology or nomenclature that has resulted from this expanded mission is included for the packaging and transportation user for reference purposes. Older terms still in use during the transition have been maintained. The Packaging and Transportation Resource Guide consists of four sections: Sect. 1, Introduction; Sect. 2, Abbreviations and Acronyms; Sect. 3, Definitions; and Sect. 4, References for packaging and transportation of hazardous materials and related activities, and Appendices A and B. Information has been collected from DOE Orders and DOE documents; U.S Department of Transportation (DOT), U.S. Environmental Protection Agency (EPA), and U.S. Nuclear Regulatory Commission (NRC) regulations; and International Atomic Energy Agency (IAEA) standards and other international documents. The definitions included in this guide may not always be a regulatory definition but are the more common DOE usage. In addition, the definitions vary among regulatory agencies. It is, therefore, suggested that if a definition is to be used in a regulatory or a legal compliance issue, the definition should be verified with the appropriate regulation. To assist in locating definitions in the regulations, a listing of all definition sections in the regulations are included in Appendix B. In many instances, the appropriate regulatory reference is indicated in the right-hand margin.

7283 (WHC-SD-FF-DRR–00018) **Design review report FFTF interim storage cask.** Scott, P.L. Westinghouse Hanford Co., Richland, WA (United States). 3 Jan 1995. 180p. Sponsored

by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95005286. Source: OSTI; NTIS; INIS; GPO Dep.

Final Design Review Report for the FFTF Interim Storage Cask. The Interim Storage Cask (ISC) will be used for long term above ground dry storage of FFTF irradiated fuel in Core Component Containers (CCC)s. The CCC has been designed and will house assemblies that have been sodium washed in the IEM Cell. The Solid Waste Cask (SWC) will transfer a full CCC from the IEM Cell to the RSB Cask Loading Station where the ISC will be located to receive it. Once the loaded ISC has been sealed at the RSB Cask Loading Station, it will be transferred by facility crane to the DSWC Transporter. After the ISC has been transferred to the Interim Storage Area (ISA), which is yet to be designed, a mobile crane will be used to place the ISC in its final storage location.

7284 (WHC-SD-SNF-EDL–001) **Interim essential and support drawing list for K Basins.** Langevin, M.J. Westinghouse Hanford Co., Richland, WA (United States). 16 Dec 1994. 22p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95005643. Source: OSTI; NTIS; INIS; GPO Dep.

This document presents a list of essential and support drawings that have been identified as required to achieve the mission objectives of K Basin and are an integral part of the in-progress K Basins system baselining effort. The drawings listed in the appendix are those drawings required to safely operate K Basins. These drawings will be authenticated through the field verification and design reconstitution programs to ensure that these identified drawings are consistent with design requirements.

7285 (WSRC-TR–94-0366) **Equivalence relations for the 9972-9975 SARP.** Niemer, K.A.; Frost, R.L. Westinghouse Savannah River Co., Aiken, SC (United States). Oct 1994. 27p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE95004800. Source: OSTI; NTIS; INIS; GPO Dep.

Equivalence relations required to determine mass limits for mixtures of nuclides for the Safety Analysis Report for Packaging (SARP) of the Savannah River Site 9972, 9973, 9974, and 9975 shipping casks were calculated. The systems analyzed included aqueous spheres, homogeneous metal spheres, and metal ball-and-shell configurations, all surrounded by an effectively infinite stainless steel or water reflector. Comparison of the equivalence calculations with the rule-of-fractions showed conservative agreement for aqueous solutions, both conservative and non-conservative agreement for the metal homogeneous sphere systems, and non-conservative agreement for the majority of metal ball-and-shell systems. Equivalence factors for the aqueous solutions and homogeneous metal spheres were calculated. The equivalence factors for the non-conservative metal homogeneous sphere systems were adjusted so that they were conservative. No equivalence factors were calculated for the ball-and-shell systems since the -SARP assumes that only homogeneous or uniformly distributed material will be shipped in the 9972-9975 shipping casks, and an unnecessarily conservative critical mass may result if the ball-and-shell configurations are included.

7286 (WSRC-TR–94-0438) **Department of Energy Plutonium ES&H Vulnerability Assessment Savannah River Site interim compensatory measures.** Bickford, W.E. Westinghouse Savannah River Co., Aiken, SC (United States). 15 Sep 1994. 32p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE95002694. Source: OSTI; NTIS; INIS; GPO Dep.

The Savannah River Site (SRS) has recently completed a self-assessment of potential vulnerabilities associated with plutonium and other transuranic materials stored at the site. An independent Working Group Assessment Team (WGAT) appointed by DOE/ES&H also performed an independent assessment, and reviewed and validated the site self-assessment. The purpose of this report is to provide a status of interim compensatory measures at SRS to address hazards in advance of any corrective actions. ES&H has requested this status for all vulnerabilities ranked medium or higher with respect to potential consequences to workers, environment, and the public.

0510 Economic, Industrial, and Business Aspects

7287 (WHC-SD-GN-CSCM–30022) **Search Hanford accessible reports electronically system configuration management plan.** White, E.L. Westinghouse Hanford Co., Richland, WA (United States). [1995]. 22p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95004493. Source: OSTI; NTIS; GPO Dep.

This Software Configuration Management Plan (SCMP) provides the requirements for control of the Search Hanford Accessible Reports Electronically (SHARE) software and documentation. The SHARE system consists of the TOPIC Text Search and Retrieval software and the programs necessary to extract information from other sources to be placed in SHARE.

0520 Waste Management

Refer also to citation(s) 7270, 7441, 7443, 7445, 7454, 7465, 7478, 7484, 7486, 7488, 7489, 7491, 7499, 7500, 7501, 7502, 7506, 7665, 7751, 7818, 7882, 8126, 8153, 8178, 8188, 8195, 8225, 8227, 8390, 8498, 8512, 8513, 8514, 8519, 8545, 9165

7288 (AEA-D and R–0891(ed.2)) **Modelling gas generation in radioactive waste repositories.** Agg, P.J. AEA Decommissioning and Radwaste, Harwell (United Kingdom). Feb 1993. 22p. Order Number DE95613248. Source: OSTI; NTIS (US Sales Only); INIS.

In a repository containing low- and intermediate-level waste, gas generation will occur principally by the coupled processes of metal corrosion and microbial degradation of cellulosic waste. This Paper describes a mathematical model design to address gas generation by these mechanisms. The metal corrosion model incorporates a three-stage process encompassing both aerobic and anaerobic corrosion regimes; the microbial degradation model simulates the activities of eight different microbial populations, which are maintained as functions both of pH and of the concentrations of particular chemical species. Gas concentrations have been measured over a period of three years in large-scale drum experiments designed to simulate repository conditions. Model predictions are confirmed against the experimental measurements, and a prediction is then made of gas concentrations and generation rates over an assessment period of one million years in a radioactive waste repository. (author).

7289 (ANL–94/33) **Basic TRUEX process for Rocky Flats Plant.** Leonard, R.A.; Chamberlain, D.B.; Dow, J.A.; Farley, S.E.; Nunez, L.; Regalbuto, M.C.; Vandegrift, G.F. Argonne National Lab., IL (United States). Aug 1994. 69p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. Order Number DE95005880. Source: OSTI; NTIS; INIS; GPO Dep.

The Generic TRUEX Model was used to develop a TRUEX process flowsheet for recovering the transuranics (Pu, Am) from a nitrate waste stream at Rocky Flats Plant. The process was designed so that it is relatively insensitive to changes in process feed concentrations and flow rates. Related issues are considered, including solvent losses, feed analysis requirements, safety, and interaction with an evaporator system for nitric acid recycle.

7290 (BNL–61127) **Subsurface barrier verification technologies, informal report.** Heiser, J.H. Brookhaven National Lab., Upton, NY (United States). Jun 1994. 14p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. Order Number DE95004950. Source: OSTI; NTIS; INIS; GPO Dep.

One of the more promising remediation options available to the DOE waste management community is subsurface barriers. Some of the uses of subsurface barriers include surrounding and/or containing buried waste, as secondary confinement of underground storage tanks, to direct or contain subsurface contaminant plumes and to restrict remediation methods, such as vacuum extraction, to a limited area. To be most effective the barriers should be continuous and depending on use, have few or no breaches. A breach may be formed through numerous pathways including: discontinuous grout application, from joints between panels and from cracking due to grout curing or wet-dry cycling. The ability to verify barrier integrity is valuable to the DOE, EPA, and commercial sector and will be required to gain full public acceptance of subsurface barriers as either primary or secondary confinement at waste sites.

It is recognized that no suitable method exists for the verification of an emplaced barrier's integrity. The large size and deep placement of subsurface barriers makes detection of leaks challenging. This becomes magnified if the permissible leakage from the site is low. Detection of small cracks (fractions of an inch) at depths of 100 feet or more has not been possible using existing surface geophysical techniques. Compounding the problem of locating flaws in a barrier is the fact that no placement technology can guarantee the completeness or integrity of the emplaced barrier. This report summarizes several commonly used or promising technologies that have been or may be applied to in-situ barrier continuity verification.

7291 (BNL-A–3259) **ALARA notes, Number 8.** Khan, T.A.; Baum, J.W.; Beckman, M.C. (eds.). Brookhaven National Lab., Upton, NY (United States). Oct 1993. 27p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). DOE Contract AC02-76CH00016. Order Number DE95005931. Source: OSTI; NTIS; INIS; GPO Dep.

This document contains information dealing with the lessons learned from the experience of nuclear plants. In this issue the authors tried to avoid the 'tyranny' of numbers and concentrated on the main lessons learned. Topics include: filtration devices for air pollution abatement, crack repair and inspection, and remote handling equipment.

7292 (CNIC–00782) **Study on treatment of wastewater containing plutonium in CIAE (China Institute of Atomic Energy).** Zeng Jishu (Academia Sinica, Beijing, BJ (China). Inst. of Atomic Energy); Su Xiguang; Xia Deying; Zhou Hongping. China Nuclear Information Centre, Beijing, BJ (China). Sep 1993. 10p. (In Chinese). (IAE–0123.). Order Number DE95613235. Source: OSTI; NTIS (US Sales Only); INIS.

The wastewater containing plutonium in China Institute of Atomic Energy (CIAE) is a kind of specific decontamination liquid waste containing $^{239,240}Pu$, ^{241}Am etc, its alpha-radioactivity is about 1×10^5 Bq/L. It is not suitable for treatment in Low-Level Radwaste Treatment Plant (LLRTP) due to its high alpha-radioactivity level and has been stored for 17 years. In view of safe management of radioactive waste, a conceptual treatment process for this liquid waste is presented. and the methods in the process are demonstrated. The results obtained show that any method of chemical coagulation precipitation, adsorption by P301 absorbent and ion exchange by macro porous cation exchange resin (D001-CC) can drop the alpha-radioactivity level below 3.7×10^3 Bq/L which could meet the acceptable requirements of LLRTP.

7293 (CONF-9401111–1-Rev.1) **Non-Salado flow and transport position paper. Revision 1.** Axness, C. (and others); Beauheim, R.; Behl, Y. Sandia National Labs., Albuquerque, NM (United States). 15 Dec 1994. 134p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. From System prioritization method (SPM) workshop; Carlsbad, NM (United States); 9 Jan 1994. Order Number DE95004830. Source: OSTI; NTIS; INIS; GPO Dep.

The US Department of Energy (DOE) is preparing to request the US Environmental Protection Agency (EPA) to certify compliance of the Waste Isolation Pilot Plant (WIPP) with long-term requirements of the environmental Radiation Protection Standards for Management and Standards for Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Waste (40 CFR Part 191). The DOE must also demonstrate compliance with the long-term requirements of the Land Disposal Restrictions of the Resource Conservation and Recovery Act (RCRA) (40 CFR Part 268.6). Sandia National Laboratories (SNL) has ben conducting iterative performance assessments (PAs) for the the WIPP to provide guidance to the project on the technical activities required to determine long-term performance of the WIPP disposal system. The most recent PA was conducted in 1992. The objectives of this paper are to: (1) Identify and describe the relationship between non-Salado hydrology and the array of scenarios that might be relevant to the long-term performance of the repository. (2) Identify and describe the array of conceptual and mechanistic models that are required to evaluate the scenarios for the purpose of compliance. (3) Identify and describe the data/information that are required to support the conceptual and mechanistic models.

7294 (CONF-941088–1) **Evolution of patterns of regional groundwater flow in southeastern New Mexico: Response to post-Pleistocene changes in climate.** Corbet, T.F. Sandia National Labs., Albuquerque, NM (United States). [1994]. 31p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. From Annual meeting of the Geological Society of America; Seattle, WA (United States); 24-27 Oct 1994. Order Number DE95005963. Source: OSTI; NTIS; INIS; GPO Dep.

The Waste Isolation Pilot Plant (WIPP) is a potential repository for transuranic wastes generated by defense programs of the US Department of Energy. The repository site is located 42 km east of the city of Carlsbad, New Mexico in a thick, Permian-age deposit of bedded salt. One consideration in evaluating the performance of the repository is that a future society might inadvertently penetrate the repository with one or more drill holes. Given certain circumstances, these holes could provide a pathway for contaminated brine to move upward into relatively permeable strata located above the bedded salt. There is concern that flowing groundwater could then transport radionuclides laterally to the sub-surface portion of the accessible environment, currently defined by the disposal regulations as the region more than 5 kilometers from the radioactive waste. The simulations presented here are part of a numerical modeling study of the possible impact that a change in climate over the next 10,000 years could have on the pattern of groundwater flow and, consequently, on the migration of radionuclides in strata overlying the repository.

7295 (CONF-9411177–Absts., [pp. n]) **Trends in safety assessment of radioactive waste repositories.** Hadermann, J. (Paul Scherrer Inst. (PSI), Villigen (Switzerland)). Paul Scherrer Inst. (PSI), Villigen (Switzerland). 1994. [36p.] From Energy days 94; Villigen (Switzerland); 10-11 Nov 1994. In *Programme and book of abstracts.* Order Number DE95743548. Source: OSTI; NTIS.

Short communication RADIOACTIVE WASTE DISPOSAL/ underground disposal; SWITZERLAND/radioactive waste disposal; SWITZERLAND/research programs; SWITZERLAND; SAFETY

7296 (CONF-950304–5) **Atmospheric corrosion monitoring at the US Department of Energy's Oak Ridge K-25 Site.** Rao, M. Oak Ridge K-25 Site, TN (United States). [1995]. 18p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OT21400. From Corrosion '95: National Association of Corrosion Engineers (NACE) international annual conference and corrosion show; Orlando, FL (United States); 26-31 Mar 1995. Order Number DE95003749. Source: OSTI; NTIS; INIS; GPO Dep.

Depleted uranium hexafluoride (UF_6) at the US Department of Energy's K-25 Site at Oak Ridge, TN has been stored in large steel cylinders which have undergone significant atmospheric corrosion damage over the last 35 years. A detailed experimental program to characterize and monitor the corrosion damage was initiated in 1992. Large amounts of corrosion scale and deep pits are found to cover cylinder surfaces. Ultrasonic wall thickness measurements have shown uniform corrosion losses up to 20 mils (0.5 mm) and pits up to 100 mils (2.5 mm) deep. Electrical resistance corrosion probes, time-of-wetness sensors and thermocouples have been attached to cylinder bodies. Atmospheric conditions are monitored using rain gauges, relative humidity sensors and thermocouples. Long-term (16 years) data are being obtained from mild steel corrosion coupons on test racks as well as attached directly to cylinder surfaces. Corrosion rates have been found to intimately related to the times-of-wetness, both tending to be higher on cylinder tops due to apparent sheltering effects. Data from the various tests are compared, discrepancies are discussed and a pattern of cylinder corrosion as a function of cylinder position and location is described.

7297 (DOE/OR–01-1258-D2) **Design assessment for Melton Valley liquid low-level waste collection and transfer system upgrade project at Oak Ridge National Laboratory, Oak Ridge, Tennessee.** Oak Ridge National Lab., TN (United States). Oct 1994. 21p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. (ORNL/M–3805). Order Number DE95004742. Source: OSTI; NTIS; INIS; GPO Dep.

This project is designed for collecting liquid low level waste (LLLW) from generating points inside the Radioisotope Engineering and Development Center (Buildings 7920 and 7930) facility and

transferring this waste to the Collection Tank (F-1800) in the new Monitoring and Control Station (MCS) facility. The LLLW is transferred to the MCS in a new, underground, jacketed, stainless steel piping system. The LLLW will then be transferred from Tank F-1800 through a new, underground, jacketed, stainless steel piping system that connects the existing Bethel Valley LLLW Collection System and the Evaporator Facility Service Tanks. The interface for the two systems will be at the existing Interconnecting Pipe Line (ICPL) Valve Box adjacent to the Nonradiological Wastewater Treatment Plant. The project scope consists of the following systems: (1) Building 7920 LLLW Collection System; (2) Building 7930 LLLW Collection System; (3) LLLW Underground Transfer System to MCS; (4) MCS Building (including all equipment contained therein); (5) LLLW Underground Transfer System to ICPL Valve Box; and (6) Leak detection system for jacketed piping systems (3) and (5).

7298 (DOE/OR–01-1292-D2) **FY 1995 Remedial Investigation Work Plan for Waste Area Grouping 2 at Oak Ridge National Laboratory, Oak Ridge, Tennessee.** Watkins, D.R.; Herbes, S.E. (eds.). Oak Ridge National Lab., TN (United States). Dec 1994. 40p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. (ORNL/ER–251-D2). Order Number DE95005882. Source: OSTI; NTIS; INIS; GPO Dep.

ESD Publication 4302.

The purpose of this project is to provide key information needed by decision makers to expedite the process of environmental restoration and to provide the data base required by the Remedial Investigation/Feasibility Study (RI/FS) for Waste Area Grouping (WAG) 2 at Oak Ridge National Laboratory (ORNL). WAG 2 is the major drainage system downgradient of other WAGs that contain significant sources of contamination at ORNL. Field activities to support the remedial investigation for the RI portion include characterization of the nature and extent of contamination in WAG 2 [consisting of White Oak Creek (WOC) and associated tributaries and floodplain, White Oak Lake (WOL), and White Oak Creek Embayment (WOCE)], specifically to support risk-based remediation decisions. The project consists of three phases: Phase 1, initial scoping characterization to determine the need for early action; Phase 2, interim activities during remediation of upslope WAGs to evaluate potential changes in the contamination status of WAG 2 that would necessitate revaluation of the need for early action; and Phase 3, completion of the RI process following remediation of upslope WAGs. Overall RI objectives, consistent with ORNL Environmental Restoration (ER) Program strategic objectives to reduce risks and comply with environmental regulations, are discussed in the WAG 2 Remedial Investigation Plan.

7299 (DOE/OR–01-1311-D2) **Design/installation and structural integrity assessment under the Federal Facility Agreement for Bethel Valley low-level waste collection and transfer system upgrade for Building 2026 (High Radiation Level Analytical Laboratory) and Building 2099 (Monitoring and Control Station) at Oak Ridge National Laboratory.** Oak Ridge National Lab., TN (United States); Gilbert/Commonwealth, Inc., Oak Ridge, TN (United States). Nov 1994. 90p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. (ORNL/ER–270-D2). Order Number DE95004740. Source: OSTI; NTIS; INIS; GPO Dep.

This document presents a Design/Installation and Structural Integrity Assessment for a replacement tank system for portions of the Bethel Valley Low-Level Waste (LLW) System, located at the Oak Ridge Reservation, Oak Ridge, Tennessee. This issue of the assessment covers the design aspects of the replacement tank system, and certifies that the design has sufficient structural integrity and is acceptable for the storing or treating of hazardous and/or radioactive substances. This document will be reissued at a future date and will then include the assessment of the installation of the replacement tank system. The present issue identifies specific activities that must be completed during the fabrication, installation, and testing of the replacement tank system in order to provide assurance that the final installation complies with governing requirements.

7300 (DOE/OR–1047-D2) **Design demonstrations for category B tank systems at Oak Ridge National Laboratory, Oak Ridge, Tennessee.** Oak Ridge National Lab., TN (United States); Foster-Wheeler Environmental Corp., Oak Ridge, TN (United States). Nov 1994. 243p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. (ORNL/M–3964). Order Number DE95004741. Source: OSTI; NTIS; INIS; GPO Dep.

This document presents design demonstrations conducted of liquid low-level waste (LLLW) storage tank systems located at the Oak Ridge National Laboratory (ORNL). Demonstration of the design of these tank systems has been stipulated by the Federal Facility Agreement (FFA) between the US Environmental Protection Agency (EPA)-Region IV; the Tennessee Department of Environment and Conservation (TDEC); and the DOE. The FFA establishes four categories of tanks. These are: Category A – New or replacement tank systems with secondary containment; Category B – Existing tank systems with secondary containment; Category C – Existing tank systems without secondary containment; Category D – Existing tank systems without secondary containment that are removed from service. This document provides a design demonstration of the secondary containment and ancillary equipment of 11 tank systems listed in the FFA as Category B. The design demonstration for each tank is presented.

7301 (DOE/OR/22160–T14) **Demonstration testing and evaluation of in situ soil heating. Treatability study work plan (Revision 2).** Sresty, G.C. IIT Research Inst., Chicago, IL (United States). 30 Dec 1994. 63p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-93OR22160. Order Number DE95004858. Source: OSTI; NTIS; INIS; GPO Dep.

A Treatability Study planned for the demonstration of the in situ electromagnetic (EM) heating process to remove organic solvents is described in this Work Plan. The treatability study will be conducted by heating subsurface vadose-zone soils in an organic plume adjacent to the Classified Burial Ground K-1070-D located at K-25 Site, Oak Ridge. The test is scheduled to start during the fourth quarter of FY94 and will be completed during the first quarter of FY95. Over the last nine years, a number of Government agencies (EPA, Army, AF, and DOE) and industries sponsored further development and testing of the in situ heating and soil decontamination process for the remediation of soils containing hazardous organic contaminants. In this process the soil is heated in situ using electrical energy. The contaminants are removed from the soil due to enhanced vaporization, steam distillation and stripping. IITRI will demonstrate the EM Process for in situ soil decontamination at K-25 Site under the proposed treatability study. Most of the contaminants of concern are volatile organics which can be removed by heating the soil to a temperature range of 85° to 95°C. The efficiency of the treatment will be determined by comparing the concentration of contaminants in soil samples. Samples will be obtained before and after the demonstration for a measurement of the concentration of contaminants of concern. This document is a Treatability Study Work Plan for the demonstration program. The document contains a description of the proposed treatability study, background of the EM heating process, description of the field equipment, and demonstration test design.

7302 (DOE/OR/22160–T15) **Demonstration testing and evaluation of in situ soil heating. Health and safety plan (Revision 2).** Dev, H. IIT Research Inst., Chicago, IL (United States). 28 Dec 1994. 180p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-93OR22160. Order Number DE95004859. Source: OSTI; NTIS; INIS; GPO Dep.

This document is the Health and Safety Plan (HASP) for the demonstration of IITRI's EM Treatment Technology. In this process, soil is heated in situ by means of electrical energy for the removal of hazardous organic contaminants. This process will be demonstrated on a small plot of contaminated soil located in the Pit Area of Classified Burial Ground K-1070-D, K-25 Site, Oak Ridge, TN. The purpose of the demonstration is to remove organic contaminants present in the soil by heating to a temperature range of 85° to 95°C. The soil will be heated in situ by applying 60-Hz AC power to an array of electrodes placed in boreholes drilled through the soil. In this section a brief description of the process is given along with a description of the site and a listing of the contaminants found in the area.

7303 (DOE/RL–93-43) **Limited field investigation report for the 100-HR-3 operable unit.** Department of Energy, Richland,

WA (United States). Richland Operations Office. Sep 1994. 137p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95004867. Source: OSTI; NTIS; INIS; GPO Dep.

This limited field investigation (LFI) was conducted to assess the applicability of interim remedial measures (IRM) for reducing human health and environmental risks within the 100-HR-3 Groundwater Operable Unit. The 100-HR-3 Operable Unit is comprised of three subareas; the 100 D Area, the 100 H Area and those portions of the 600 Area between the two reactor areas. The operable unit is one of seven operable units associated with the 100 D and H Areas. Operable units 100-DR-1, 100-DR-2, 100-DR-3, 100-HR-1, 100-HR-2 and 100-IU-4 address contaminant sources while 100-HR-3 addresses contamination present in the underlying groundwater. The primary method of field investigation used during this LFI was the installation and sampling of monitoring wells. Samples were collected from the groundwater and soils, and submitted for laboratory analysis. Boreholes were surveyed for radiological contamination using downhole geophysical techniques to further delineate the locations and levels of contaminants. All samples were screened to ascertain the presence of volatile organic compounds and radionuclides. Analytical data were subjected to validation; all round one, two and three and a minimum of 10% of round four data associated with the LFI were validated. A screening method was used to identify contaminants of potential concern (COPC). This screening method eliminated from further consideration, constituents that were below background. Constituents which are considered non-toxic to humans were eliminated from the human health evaluation. Data consistency and blank contamination were also evaluated in the screening process. These COPC were then evaluated further in the qualitative risk assessment (QRA). A human health QRA was performed using conservative (maximum equilibrated contaminant levels from the LFI) analyses.

7304 (DOE/RL–93-78) **Limited field investigation report for the 100-KR-1 operable unit.** Department of Energy, Richland, WA (United States). Richland Operations Office. Aug 1994. 198p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95004866. Source: OSTI; NTIS; INIS; GPO Dep.

The Hanford Site Hear Richland, Washington was used by the U.S. Government to produce plutonium for nuclear weapons. The U.S. Department of Energy (DOE) currently manages the site that contains six operational areas. The U.S. Environmental Protection Agency (EPA) placed four of these six areas (the 100, 200, 300, and 1100 Areas) on the National Priorities List (NPL) in November 1989, under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980. The Hanford Federal Facility Agreement and Consent Order subdivided the individual operational areas into source and groundwater operable units 2based on waste disposal information, location, facility type, and other site characteristics. Source operable units include facilities and unplanned release sites that are potential sources of hazardous substance contamination. The 100-KR-1 operable unit is a source operable unit within the 100 Area. Data collection and analysis activities conducted at the 100-KR-1 source operable unit during the limited field investigation (LFI) and the qualitative risk assessment (QRA) are summarized in this report. The purpose of the report is to evaluate available information and provide sufficient rationale to select sites for implementation of interim remedial measures (IRM).

7305 (DOE/RL–93-98) **Pilot-scale treatability test plan for the 200-BP-5 operable unit.** Department of Energy, Richland, WA (United States). Richland Operations Office. Aug 1994. 170p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95004868. Source: OSTI; NTIS; INIS; GPO Dep.

This document presents the treatability test plan for pilot-scale pump and treat testing at the 200-BP-5 Operable Unit. This treatability test plan has been prepared in response to an agreement between the U.S. Department of Energy (DOE), the U.S. Environmental Protection Agency (EPA), and the State of Washington Department of Ecology (Ecology), as documented in Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement, Ecology et al. 1989a) Change Control Form M-13-93-03 (Ecology et al. 1994) and a recent 200 NPL Agreement Change Control Form (Appendix A). The agreement also requires that, following completion of the activities described in this test plan, a 200-BP-5 Operable Unit Interim Remedial Measure (IRM) Proposed Plan be developed for use in preparing an Interim Action Record of Decision (ROD). The IRM Proposed Plan will be supported by the results of this treatability test plan, as well as by other 200-BP-5 Operable Unit activities (e.g., development of a qualitative risk assessment). Once issued, the Interim Action ROD will specify the interim action(s) for groundwater contamination at the 200-BP-5 Operable Unit. The treatability test approach is to conduct a pilot-scale pump and treat test for each of the two contaminant plumes associated with the 200-BP-5 Operable Unit. Primary contaminants of concern are ^{99}Tc and ^{60}Co for underwater affected by past discharges to the 216-BY Cribs, and ^{90}Sr, $^{239/240}$Pu, and Cs for groundwater affected by past discharges to the 216-B-5 Reverse Well. The purpose of the pilot-scale treatability testing presented in this testplan is to provide the data basis for preparing an IRM Proposed Plan. To achieve this objective, treatability testing must: Assess the performance of groundwater pumping with respect to the ability to extract a significant amount of the primary contaminant mass present in the two contaminant plumes.

7306 (DOE/RL–94-54) **Pilot-scale treatability test plan for the 100-HR-3 operable unit.** Department of Energy, Richland, WA (United States). Richland Operations Office. Aug 1994. 74p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95004871. Source: OSTI; NTIS; INIS; GPO Dep.

This document presents the treatability test plan for pilot-scale pump-and-treat testing at the 100-HR-3 Operable Unit. The test will be conducted in fulfillment of interim Milestone M-15-06E to begin pilot-scale pump-and-treat operations by August 1994. The scope of the test was determined based on the results of lab/bench-scale tests (WHC 1993a) conducted in fulfillment of Milestone M-15-06B. These milestones were established per agreement between the U.S. Department of Energy (DOE), the Washington State Department of Ecology and the U.S. Environmental Protection Agency (EPA), and documented on Hanford Federal of Ecology Facility Agreement and Consent Order Change Control Form M-15-93-02. This test plan discusses a pilot-scale pump-and-treat test for the chromium plume associated with the D Reactor portion of the 100-HR-3 Operable Unit. Data will be collected during the pilot test to assess the effectiveness, operating parameters, and resource needs of the ion exchange (IX) pump-and-treat system. The test will provide information to assess the ability to remove contaminants by extracting groundwater from wells and treating extracted groundwater using IX. Bench-scale tests were conducted previously in which chromium VI was identified as the primary contaminant of concern in the 100-D reactor plume. The DOWEX 21K™ resin was recommended for pilot-scale testing of an IX pump-and-treat system. The bench-scale test demonstrated that the system could remove chromium VI from groundwater to concentrations less than 50 ppb. The test also identified process parameters to monitor during pilot-scale testing. Water will be re-injected into the plume using wells outside the zone of influence and upgradient of the extraction well.

7307 (DOE/SR/18445–T1) **Infrastructure support for the Waste Management Institute at North Carolina A&T State University. Progress report, September 1994–January 1995.** Uzochukwu, G.A. North Carolina Agricultural and Technical State Univ., Greensboro, NC (United States). 25 Jan 1995. 44p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG09-94SR18445. Order Number DE95005776. Source: OSTI; NTIS; INIS; GPO Dep.

The mission of the Waste Management Institute is two-fold: (1) to enhance awareness and understanding of waste problems and their management in our society and, (2) to provide leadership in research, instruction and outreach to improve the quality of life on a global scale and protect the environment.

7308 (DPW–55-4-9) **200 Area weekly report.** Christl, R.J. Du Pont de Nemours (E.I.) and Co., Wilmington, DE (United States). Explosives Dept. 2 Mar 1955. 3p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-76SR00001. (SR/H–870). Order Number DE95002498. Source: OSTI; NTIS; GPO Dep.

Short communication. SAVANNAH RIVER PLANT/radioactive waste facilities; RADIOACTIVE WASTE FACILITIES/operation; SOLVENT EXTRACTION; OPERATION; MIXER-SETTLERS; RADIOACTIVE WASTE PROCESSING; COOLANTS; WATER; PRODUCTION REACTORS

7309 (DPW–55-4-10) **200 Area weekly report.** Christl, R.J. Du Pont de Nemours (E.I.) and Co., Wilmington, DE (United States). Explosives Dept. 10 Mar 1955. 2p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-76SR00001. (SR/H–871). Order Number DE95002499. Source: OSTI; NTIS; GPO Dep.

Short communication. RADIOACTIVE WASTE FACILITIES/operation; SAVANNAH RIVER PLANT/radioactive waste facilities; SOLVENT EXTRACTION; OPERATION; TANKS; RADIOACTIVE WASTE PROCESSING; PRODUCTION REACTORS

7310 (DPW–55-4-40) **200 Area weekly report.** Christl, R.J. Du Pont de Nemours (E.I.) and Co., Wilmington, DE (United States). Explosives Dept. 6 Oct 1955. 3p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-76SR00001. (SR/H–858). Order Number DE95002436. Source: OSTI; NTIS; GPO Dep.

Short communication. SAVANNAH RIVER PLANT/radioactive waste facilities; RADIOACTIVE WASTE FACILITIES/operation; OPERATION; PRODUCTION REACTORS; SOLVENT EXTRACTION; RADIOACTIVE WASTE PROCESSING; SHIELDING; TANKS

7311 (EGG-WM–11049) **Aggradational and erosional history of the Radioactive Waste Management Complex at the Idaho National Engineering Laboratory.** Dechert, T.V. (Idaho Univ., Moscow, ID (United States)); McDaniel, P.A.; Falen, A.L. EG and G Idaho, Inc., Idaho Falls, ID (United States); Idaho Univ., Moscow, ID (United States). Sep 1994. 76p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC07-76ID01570. Order Number DE95002018. Source: OSTI; NTIS; INIS; GPO Dep.

Long-term performance of the low-level waste disposal site at the Radioactive Waste Management Complex (RWMC) is partially dependent on the stability of the land surface with respect to erosion of cover materials. This document discusses the aggradational and erosional history of the naturally occurring sediments and soils in and around the RWMC, focusing on the late-Pleistocene and Holocene epochs. Other related issues include the ages of the various deposits, the extent to which they have been altered by soil formation and other processes, their relationships to the basalt flows in the area, and the impact of human activity on the materials at the RWMC.

7312 (EGG-WM–11467) **Hazards assessment for the Waste Experimental Reduction Facility.** Calley, M.B.; Jones, J.L. Jr. EG and G Idaho, Inc., Idaho Falls, ID (United States). 19 Sep 1994. 175p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC07-76ID01570. Order Number DE95002019. Source: OSTI; NTIS; INIS; GPO Dep.

This report documents the hazards assessment for the Waste Experimental Reduction Facility (WERF) located at the Idaho National Engineering Laboratory, which is operated by EG&G Idaho, Inc., for the US Department of Energy (DOE). The hazards assessment was performed to ensure that this facility complies with DOE and company requirements pertaining to emergency planning and preparedness for operational emergencies. DOE Order 5500.3A requires that a facility-specific hazards assessment be performed to provide the technical basis for facility emergency planning efforts. This hazards assessment was conducted in accordance with DOE Headquarters and DOE Idaho Operations Office (DOE-ID) guidance to comply with DOE Order 5500.3A. The hazards assessment identifies and analyzes hazards that are significant enough to warrant consideration in a facility's operational emergency management program. This hazards assessment describes the WERF, the area surrounding WERF, associated buildings and structures at WERF, and the processes performed at WERF. All radiological and nonradiological hazardous materials stored, used, or produced at WERF were identified and screened. Even though the screening process indicated that the hazardous materials could be screened from further analysis because the inventory of radiological and nonradiological hazardous materials were below the screening thresholds specified by DOE and DOE-ID guidance for DOE Order 5500.3A, the nonradiological hazardous materials were analyzed further because it was felt that the nonradiological hazardous material screening thresholds were too high.

7313 (ES/ER/TM–102/R1) **Waste generation forecast for DOE-ORO's Environmental Restoration OR-1 Project: FY 1995-FY 2002, September 1994 revision.** Oak Ridge National Lab., TN (United States). Dec 1994. 105p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE95004874. Source: OSTI; NTIS; INIS; GPO Dep.

A comprehensive waste-forecasting task was initiated in FY 1991 to provide a consistent, documented estimate of the volumes of waste expected to be generated as a result of U.S. Department of Energy-Oak Ridge Operations (DOE-ORO) Environmental Restoration (ER) OR-1 Project activities. Continual changes in the scope and schedules for remedial action (RA) and decontamination and decommissioning (D&D) activities have required that an integrated data base system be developed that can be easily revised to keep pace with changes and provide appropriate tabular and graphical output. The output can then be analyzed and used to drive planning assumptions for treatment, storage, and disposal (TSD) facilities. The results of this forecasting effort and a description of the data base developed to support it are provided herein. The initial waste-generation forecast results were compiled in November 1991. Since the initial forecast report, the forecast data have been revised annually. This report reflects revisions as of September 1994.

7314 (GSF–10/94) **Calculation of the radiation transport in rock salt using Monte Carlo methods. Final report. HAW project.** Till, E.; Zankl, M.; Regulla, D. GSF - Forschungszentrum fuer Umwelt und Gesundheit GmbH, Neuherberg (Germany). Inst. fuer Strahlenschutz. Jan 1994. 528p. Sponsored by Bundesministerium fuer Forschung und Technologie, Bonn (Germany);Commission of the European Communities, Brussels (Belgium). Contract CEC FI2W-CT90-0002. Order Number DE95738784. Source: OSTI; NTIS (US Sales Only); INIS.

This report provides absorbed dose rate and photon fluence rate distributions in rock salt around 30 testwise emplaced canisters containing high-level radioactive material (HAW project) and around a single canister containing radioactive material of a lower activity level (INHAW experiment). The site of this test emplacement was located in test galleries at the 800-m-level in the Asse salt mine. The data given were calculated using a Monte Carlo method simulating photon transport in complex geometries of differently composed materials. The aim of these calculations was to enable determination of the dose absorbed in any arbitrary sample of salt to be further examined in the future with sufficient reliability. The geometry of the test arrangement, the materials involved and the calculational method are characterised and the results are shortly described and some figures presenting selected results are shown. In the appendices, the results for emplacement of the highly radioactive canisters are given in tabular form. (orig.)

7315 (HLW-TEC–940020) **High-level waste management technology program plan.** Harmon, H.D. Westinghouse Savannah River Co., Aiken, SC (United States). [1995]. 121p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE95004828. Source: OSTI; NTIS; INIS; GPO Dep.

The purpose of this plan is to document the integrated technology program plan for the Savannah River Site (SRS) High-Level Waste (HLW) Management System. The mission of the SRS HLW System is to receive and store SRS high-level wastes in a see and environmentally sound, and to convert these wastes into forms suitable for final disposal. These final disposal forms are borosilicate glass to be sent to the Federal Repository, Saltstone grout to be disposed of on site, and treated waste water to be released to the environment via a permitted outfall. Thus, the technology development activities described herein are those activities required to enable successful accomplishment of this mission. The technology program is based on specific needs of the SRS HLW System and organized following the systems engineering level 3 functions. Technology needs for each level 3 function are listed as reference, enhancements, and alternatives. Finally, FY-95 funding, deliverables, and schedules are s in Chapter IV with details on the

specific tasks that are funded in FY-95 provided in Appendix A. The information in this report represents the vision of activities as defined at the beginning of the fiscal year. Depending on emergent issues, funding changes, and other factors, programs and milestones may be adjusted during the fiscal year. The FY-95 SRS HLW technology program strongly emphasizes startup support for the Defense Waste Processing Facility and In-Tank Precipitation. Closure of technical issues associated with these operations has been given highest priority. Consequently, efforts on longer term enhancements and alternatives are receiving minimal funding. However, High-Level Waste Management is committed to participation in the national Radioactive Waste Tank Remediation Technology Focus Area. 4 refs., 5 figs., 9 tabs.

7316 (INIS-mf–14431) **The radioactive waste safety standards (RADWASS) programme. A series of international consensus documents on the safe management and disposal of radioactive waste.** International Atomic Energy Agency, Vienna (Austria). Feb 1992. 16p. (STI/PUB–901.). Order Number DE95613230. Source: OSTI; NTIS (US Sales Only); INIS.

IAEA publishes Safety Series on the subject of waste management, covering important areas. The Radioactive Waste Safety Standards (RADWASS) series is being developed to (i) improve the visibility and status of IAEA publication related to safety aspects of waste management; and (ii) impose a more logical structure on safety publications in the waste management area. In this document some technical areas of waste management are identified and related planned publications are listed.

7317 (INIS-mf–14432) **Waste management assessment and technical review programme. WATRP. An international peer review service for radioactive waste management activities.** International Atomic Energy Agency, Vienna (Austria). Sep 1994. 12p. (IAEA-WATRP–94.). Order Number DE95613231. Source: OSTI; NTIS (US Sales Only); INIS.

International Atomic Energy Agency provides international peer review services in radioactive waste management to those Member States that have established radioactive waste management programmes. Such services are provided within Waste Management Assessment and Technical Review Programme (WATRP). The main objective of WATRP is to provide international expertise and information on a requested subject in the field of radioactive waste management and to validate that programmes and activities are sound and performing well. Refs, figs and tabs.

7318 (INIS-mf–14435, pp. MC6.1-MC6.5) **Applications of multicriteria decision making methods in Czech nuclear energetics.** Halova, J. (Academy of Sciences of the Czech Republic, Institute of Inorganic Chemistry, Prague (Czech Republic)). No corporate text available. Oct 1993. 100p. (CONF-9310403–: The mining Pribram in science and technology, Pribram (Czech Republic), 13-16 Oct 1993). In *The mining Pribram in science and technology. Section MC: Mathematical methods in geology.* Order Number DE95613232. Source: OSTI; NTIS (US Sales Only); INIS.

Criteria are given for the choice of an optimum radioactive waste management method as well as their normalized weights. The highest value was assigned to the criterion 'Product quality' (0.1702). The aspects of quality criteria for bituminized nuclear reactor wastes are presented; the most important aspects of product quality are chemical durability (3.157) and leachability (2.556) of biotoxic radionuclides. Results are also presented of a multicriterial risk evaluation of alternative energy sources; it is concluded that coal is the least favorable energy source. (J.B.) 9 refs.

7319 (Juel–2834) **The chemical behaviour of iodine-129 in the process of radwaste conditioning.** Schon, T. Forschungszentrum Juelich GmbH (Germany). Inst. fuer Sicherheitsforschung und Reaktortechnik; Technische Hochschule Aachen (Germany). Nov 1993. 92p. (In German). Order Number DE95738857. Source: OSTI; NTIS (US Sales Only); INIS.

During radwaste reprocessing, elemental I-129 may almost completely be transferred to the dissolver off-gas stream. The AC 6120 adsorbent, consisting of high-heated, amorphous silicic acid impregnated with silver nitrate, proved to be particularly efficient for removing the iodine from the off-gas. In a gas-solid reaction, the elemental iodine is converted into solid silver iodide and silver iodate. The reaction's stoichiometry depends on the loading temperature, with temperatures between 30 and 80 C resulting in a ratio of five between the reaction products of AgI and $AgIO_3$, while with temperatures higher than that, up to 150 C, the ratio is three. For assessing the acceptability of the iodine-bearing AC 6120 as a waste product to be emplaced in a salt rock repository, the ratio of the reaction products is one of the main criteria. The products solubility and its complexation reactions with chloride-bearing brines are two other important criteria, especially with a view to the not completely hypothetical accident type of 'water ingress into the salt cavern'. Leaching experiments have shown that in this event, between 30 and over 60% of the waste product's iodine inventory would be leached out within only seven days. Thus AC 6120 is not a candidate adsorbent for immobilization of iodine 129 in a waste product. (orig./HP)

7320 (KAERI/RR–1325/93) **A study on the radioactive waste management for DUPIC fuel cycle - A study on the direct use of spent PWR fuel in CANDU.** Park, Hyeon Soo (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Chun, Kwan Sik; Kim, Jong Ho; Cho, Yeong Hyeon; Paek, Seung Uh; Kang, Hee Seok; Na, Jeong Won; Choi, Jong Won; Lee, Hu Keun; Park, Keun Il; Yang, Seung Yeong. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jul 1994. 129p. (In Korean). Order Number DE95613236. Source: OSTI; NTIS; INIS.

The characteristics of the radioactive wastes coming from the DUPIC fuel manufacturing process were analyzed and evaluated. The release amounts of nuclides were estimated, and the characteristics of the oxides of semi-volatile nuclides such as Ru and Cs were analyzed and also these trapping and fixation technologies were assessed. The conceptual methods of experiment including apparatus and procedure were completed to define the vaporization behavior of nuclides. The gross α-activity and α-, γ-spectrum of irradiated zircaloy specimens from KORI unit 1 were analyzed and the press to test the compaction of hulls was manufactured. Ingestion hazard index for the disposal of spent DUPIC fuel were calculated using ORIGEN 2 code and compared with the disposal of once-through spent PWR and CANDU fuels, and then the index per kwh for DUPIC cycle was $1/8 \approx 1/4$ lower than that for once-through cycle. (Author).

7321 (KFK–5326, pp. 115-131) **Actinide burning in fast reactors. KfK contributions to the CAPRA code.** Heusener, G. (Kernforschungszentrum Karlsruhe (Germany)); Muehling, G. Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Nukleare Sicherheitsforschung. May 1994. (In German). (CONF-9403194–: Status report of Projekt Nukleare Sicherheitsforschung (PSF) of Kernforschungszentrum Karlsruhe GmbH (KfK), Karlsruhe (Germany), 23 Mar 1994). In *Papers presented as part of the status report of the Nuclear Safety Research Project of the Karlsruhe Nuclear Center on 23 March 1994.* 284p. Order Number DE95738354. Source: OSTI; NTIS (US Sales Only); INIS.

The CAPRA program performs a feasibilty study of the possibilities of Pu burning, and of transmutation of minor actinides in optimized fast reactors. The KfK takes part in the program priorities of neutron physics core designs, safety experiments with optimized cores, and fuel studies. (DG)

7322 (KFK–5328) **PROSDOR: An IBM-3090 based semi-automated procedure linking HERMES MCNP and KORIGEN for the burnup analysis of accelerator driven cores.** Segev, M. Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Neutronenphysik und Reaktortechnik; Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Nukleare Sicherheitsforschung. Jul 1994. 26p. Order Number DE95738239. Source: OSTI; NTIS (US Sales Only); INIS.

This report guides the user of PROSDOR in the execution of the various calculational steps needed to carry out a burnup study of a fission subcritical target driven by high energy protons. The introduction of the files and programs involved is made in close reference to the procedural chronological execution steps. The PROSDOR is a dedicated linkage between the HERMES, MCNP, and KORIGEN codes. At this point it is limited to a cylindrical homogeneous target, enabling the analysis of a truely homogeneous core or a hard spectrum lattice, with planned upgrading. (orig.)

7323 (LA–12889) **Distributions of 12 elements on 64 absorbers from simulated Hanford Neutralized Current Acid Waste (NCAW).** Svitra, Z.V. (Los Alamos National Lab., NM (United States)); Bowen, S.M.; Marsh, S.F. Los Alamos National Lab., NM (United States). Dec 1994. 48p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. Order Number DE95005651. Source: OSTI; NTIS; INIS; GPO Dep.

As part of the Hanford Tank Waste Remediation System program at Los Alamos, we evaluated 64 commercially available or experimental absorber materials for their ability to remove hazardous components from high-level waste. These absorbers included cation and anion exchange resins, inorganic exchangers, composite absorbers, and a series of liquid extractants sorbed on porous support-beads. We tested these absorbers with a solution that simulates Hanford neutralized current acid waste (NCAW) (pH 14.2). To this simulant solution we added the appropriate radionuclides and used gamma spectrometry to measure fission products (Cs, Sr, Tc, and Y) and matrix elements (Cr, Co, Fe, Mn, Ni, V, Zn, and Zr). For each of 768 element/absorber combinations, we measured distribution coefficients for dynamic contact periods of 30 min, 2 h, and 6 h to obtain information about sorption kinetics. On the basis of these 2304 measured distribution coefficients, we determined that many of the tested absorbers may be suitable for processing NCAW solutions.

7324 (LA-UR–94-3483) **Soil pore-gas sampling by photoacoustic radiometry.** Sollid, J.E. Los Alamos National Lab., NM (United States). [1994]. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9411144–1: Optical sensing for environmental and process monitoring, McLean, VA (United States), 7-10 Nov 1994). Order Number DE95002717. Source: OSTI; NTIS; INIS; GPO Dep.

Concentrations of volatile organics in a soil pore-gas plume were measured using a commercially available multigas monitor. The monitor is a photoacoustic radiometer (PAR) controlled by an onboard, programmable microprocessor. The measurements determine the extent and location of the vapor plume in the subsurface. At least twelve wells surrounding the sources are measured quarterly. The sources are located in former liquid chemical waste disposal pits and shafts at Los Alamos National Laboratory. The primary constituents of the plume are 1,1,1 trichloroethane (TCA), trichloroethene (TCE), and tetrachloroethene or perchloroethene or perchloroethene (PCE). Four quarters of data are presented for TCA. All were used primarily as solvents and degreasers. Previously the composition of the vapor plume was determined by Gas Chromatography Mass Spectrometer GCMS methods. Photoacoustic radiometry and gas chromatography are discussed giving the advantages and disadvantages of each method, although in this program they are basically complementary. Gas chromatography is a more qualitative method to determine which analytes are present and the approximate concentration. Photoacoustic radiometry, to function well, requires foreknowledge of constituents and serves best to determine how much is present. Measurements are quicker and more direct with photoacoustic methods. Once the constituents to be measured are known, the cost to monitor is much less using photoacoustics, and the results are available more quickly.

7325 (LA-UR–94-4371) **Funneling in LANL high intensity linac designs.** Nath, S. Los Alamos National Lab., NM (United States). [1994]. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9407103–33: International conference on accelerator-driven transmutation technologies and applications, Las Vegas, NV (United States), 25-28 Jul 1994). Order Number DE95005244. Source: OSTI; NTIS; INIS; GPO Dep.

The Los Alamos design approach to Accelerator driven transmutation applications is based on high power proton linacs. Most of the accelerators that have been studied have one important element in common. That component is a funnel, where beams from two separate but identical front end linac systems are merged to form a collinear beam of twice the initial beam intensity. The nominal linac design for Accelerator Transmutation of Waste (ATW) consists of an ion source-injector/Radio Frequency Quadrupole (RFQ)/Drift Tube Linac (DTL) combination operating at 350 MHz. The output beam at 20 MeV from each of the DTLs is then funneled to a single high energy linac operating at 700 MHz which achieve higher beam intensity, a beam dynamics design, and simulation results through the funnel section, together with the present experimental status of funneling.

7326 (LBL–34468) **Development of analytical and numerical models for the assessment and interpretation of hydrogeological field tests.** Mironenko, V.A. (St. Petersburg Mining Inst. (Russian Federation)); Rumynin, V.G.; Konosavsky, P.K.; Pozdniakov, S.P.; Shestakov, V.M.; Roshal, A.A. Lawrence Berkeley Lab., CA (United States). Jul 1994. 94p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00098. Order Number DE95006725. Source: OSTI; NTIS; INIS; GPO Dep.

Mathematical models of the flow and tracer tests in fractured aquifers are being developed for the further study of radioactive wastes migration in round water at the Lake Area, which is associated with one of the waste disposal site in Russia. The choice of testing methods, tracer types (chemical or thermal) and the appropriate models are determined by the nature of the ongoing ground-water pollution processes and the hydrogeological features of the site under consideration. Special importance is attached to the increased density of wastes as well as to the possible redistribution of solutes both in the liquid phase and in the absorbed state (largely, on fracture surfaces). This allows for studying physical-and-chemical (hydrogeochemical) interaction parameters which are hard to obtain (considering a fractured structure of the rock mass) in laboratory. Moreover, a theoretical substantiation is being given to the field methods of studying the properties of a fractured stratum aimed at the further construction of the drainage system or the subsurface flow barrier (cutoff wall), as well as the monitoring system that will evaluate the reliability of these ground-water protection measures. The proposed mathematical models are based on a tight combination of analytical and numerical methods, the former being preferred in solving the principal (2D axisymmetrical) class of the problems. The choice of appropriate problems is based on the close feedback with subsequent field tests in the Lake Area. 63 refs.

7327 (LBL–36385) **Computer simulation of radionuclide transport through thermal convection of groundwater from borehole repositories.** Malkovsky, V.I. (Russian Academy of Sciences, Moscow (Russian Federation). Inst. of Geology of Ore Deposits, Petrography, Mineralogy and Geochemistry); Pek, A.A. Lawrence Berkeley Lab., CA (United States). Sep 1993. 27p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00098. Order Number DE95006722. Source: OSTI; NTIS; INIS; GPO Dep.

Results are presented of numerical modeling of radionuclide transport by thermal convection of groundwater from a single well repository of high level waste. Because the problem possesses cylindrical symmetry, the process is described by a system of 2-D transient equations for momentum, convective heat transfer and convective mass transfer (taking into account hydrodynamic dispersion and radionuclide decay). Results of computer simulations for a selected range of system parameters were generalized by approximating analytical relationship, which can be used for safety assessment of a radioactive waste repository. The problem of the reciprocal relationship between thermoconvective transport processes and well spacing in an underground repository with a regularly spaced set of the waste-loaded wells is examined using a two-well model as an example. In this case, the transport problem becomes three-dimensional. A solution to this problem was obtained using a special system of orthogonal coordinates, which simplifies the computational algorithm and enhances accuracy. It is shown that thermoconvective transport of radionuclides in the vicinity of each well can be considered to be independent at well separations of the order of 100 m when reasonable values of other repository parameters are assumed.

7328 (LBL–36387) **Modeling of the fault-controlled hydrothermal ore-forming systems.** Pek, A.A. (Russian Academy of Sciences, Moscow (Russian Federation). Inst. of Geology of Ore Deposits, Petrography, Mineralogy and Geochemistry); Malkovsky, V.I. Lawrence Berkeley Lab., CA (United States). Jul 1993. 25p. Sponsored by USDOE, Washington, DC (United States). DOE

Contract AC03-76SF00098. Order Number DE95006726. Source: OSTI; NTIS; INIS; GPO Dep.

A necessary precondition for the formation of hydrothermal ore deposits is a strong focusing of hydrothermal flow as fluids move from the fluid source to the site of ore deposition. The spatial distribution of hydrothermal deposits favors the concept that such fluid flow focusing is controlled, for the most part, by regional faults which provide a low resistance path for hydrothermal solutions. Results of electric analog simulations, analytical solutions, and computer simulations of the fluid flow, in a fault-controlled single-pass advective system, confirm this concept. The influence of the fluid flow focusing on the heat and mass transfer in a single-pass advective system was investigated for a simplified version of the metamorphic model for the genesis of greenstone-hosted gold deposits. The spatial distribution of ore mineralization, predicted by computer simulation, is in reasonable agreement with geological observations. Computer simulations of the fault-controlled thermo-convective system revealed a complex pattern of mixing hydrothermal solutions in the model, which also simulates the development of the modern hydrothermal systems on the ocean floor. The specific feature of the model considered, is the development under certain conditions of an intra-fault convective cell that operates essentially independently of the large scale circulation. These and other results obtained during the study indicate that modeling of natural fault-controlled hydrothermal systems is instructive for the analysis of transport processes in man-made hydrothermal systems that could develop in geologic high-level nuclear waste repositories.

7329 (LBL–36467) **Combined analysis of surface reflection imaging and vertical seismic profiling at Yucca Mountain, Nevada.** Daley, T.M. (Lawrence Berkeley Lab., CA (United States). Earth Sciences Div.); Majer, E.L.; Karageorgi, E. Lawrence Berkeley Lab., CA (United States). Aug 1994. 44p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00098. Order Number DE95006724. Source: OSTI; NTIS; INIS; GPO Dep.

This report presents results from surface and borehole seismic profiling performed by the Lawrence Berkeley Laboratory (LBL) on Yucca Mountain. This work was performed as part of the site characterization effort for the potential high-level nuclear waste repository. Their objective was to provide seismic imaging from the near surface (200 to 300 ft. depth) to the repository horizon and below, if possible. Among the issues addressed by this seismic imaging work are location and depth of fracturing and faulting, geologic identification of reflecting horizons, and spatial continuity of reflecting horizons. The authors believe their results are generally positive, with tome specific successes. This was the first attempt at this scale using modem seismic imaging techniques to determine geologic features on Yucca Mountain. The principle purpose of this report is to present the interpretation of the seismic reflection section in a geologic context. Three surface reflection profiles were acquired and processed as part of this study. Because of environmental concerns, all three lines were on preexisting roads. Line 1 crossed the mapped surface trace of the Ghost Dance fault and it was intended to study the dip and depth extent of the fault system. Line 2 was acquired along Drill Hole wash and was intended to help the ESF north ramp design activities. Line 3 was acquired along Yucca Crest and was designed to image geologic horizons which were thought to be less faulted along the ridge. Unfortunately, line 3 proved to have poor data quality, in part because of winds, poor field conditions and limited time. Their processing and interpretation efforts were focused on lines 1 and 2 and their associated VSP studies.

7330 (LBL–36614) **Progress on flow visualization and relative permeability measurement in transparent replicas of natural fractures from Yucca Mountain.** Persoff, P. (Lawrence Berkeley Lab., CA (United States). Earth Sciences Div.); Pruess, K.; Petersen, L.P. Lawrence Berkeley Lab., CA (United States). Jan 1995. 27p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00098. Order Number DE95006723. Source: OSTI; NTIS; INIS; GPO Dep.

Small sections (75 mm x 75 mm) of two natural rock fractures from outcrop boulders of Tiva Canyon tuff have been reproduced as transparent replicas. Aperture maps were drawn from images of the replicas filled with dye. Apertures were measured by the areas occupied by liquid drops of known volume. For both these fractures, the average aperture is about 350 μm, while the hydraulic aperture is less (72 and 130 μm). Two-phase (air-water) flow experiments have been conducted in these replicas to measure relative permeability and capillary pressures. The results obtained confirm the results of previous fracture experiments, and theoretical analysis, that the sum of relative permeabilities is much less than 1 at intermediate saturations. The welded tuffs in the vadose zone of Yucca Mountain, Nevada, are being investigated as the potential site of a geological repository for high-level nuclear wastes.

7331 (LUTVDG-TVVR–1011) **Contaminant migration in rock aquifers.** Dahlbom, P. Lund Univ. (Sweden). Dept. of Water Resources Engineering. 28 Oct 1994. 183p. Order Number DE95613249. Source: OSTI; NTIS; INIS.

This work deals with fractured rock as a host for deposits of hazardous waste. A literature review of modelling approaches and methods for field investigations concerning flow and migration in fractured rock is given. The literature study on field observations shows that the water flow in fractured rock is unevenly distributed, which contradicts the porous medium approach. Some idealized examples are given to investigate where to find low hydraulic gradients. The ability of a laminar pipe-flow model to reproduce the hydrodynamic transport of contaminated groundwater in fractured rock is investigated. It is assumed that the cross-section areas in an ensemble of tubes have a gamma distribution. The model is applied to field tracer experiments at two sites. An attempt is made to model a fracture with irregular aperture as a two-dimensional stochastic process with known correlation structure. It is assumed that the fracture aperture is lognormally distributed, and that the flow is laminar. A particle following algorithm is applied. A comparison with the porous medium approach, and with the laminar pipe flow model is made. 135 refs, 41 figs, 4 tabs.

7332 (NEI-SE–170) **Radioactive waste processing and disposal. A complement to the program 1992.** Swedish Nuclear Fuel and Waste Management Co., Stockholm (Sweden). Aug 1994. 121p. (In Swedish). Order Number DE95613233. Source: OSTI; NTIS; INIS.

The report is a complement to a previous report (published 1992) about the Swedish program of processing and disposal of radioactive waste from the Swedish nuclear power reactors. 14 refs, figs, tabs.

7333 (ORNL/ER/Sub–87-99053/28) **Selection of liquid-level monitoring method for the Oak Ridge National Laboratory inactive liquid low-level waste tanks, remedial investigation/feasibility study.** Oak Ridge National Lab., TN (United States); Bechtel Environmental, Inc., Oak Ridge, TN (United States); CH2M Hill Southeast, Inc., Oak Ridge, TN (United States); Ogden Environmental and Energy Services Co., Oak Ridge, TN (United States); Peer Consultants, Inc., Oak Ridge, TN (United States). Nov 1994. 37p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Subcontract 12B-99053C. Order Number DE95004736. Source: OSTI; NTIS; INIS; GPO Dep.

Several of the inactive liquid low-level waste (LLLW) tanks at Oak Ridge National Laboratory contain residual wastes in liquid or solid (sludge) form or both. A plan of action has been developed to ensure that potential environmental impacts from the waste remaining in the inactive LLLW tank systems are minimized. This document describes the evaluation and selection of a methodology for monitoring the level of the liquid in inactive LLLW tanks. Criteria are established for comparison of existing level monitoring and leak testing methods; a preferred method is selected and a decision methodology for monitoring the level of the liquid in the tanks is presented for implementation. The methodology selected can be used to continuously monitor the tanks pending disposition of the wastes for treatment and disposal. Tanks that are empty, are scheduled to be emptied in the near future, or have liquid contents that are very low risk to the environment were not considered to be candidates for installing level monitoring. Tanks requiring new monitoring equipment were provided with conductivity probes; tanks with existing level monitoring instrumentation were not modified.

The resulting data will be analyzed to determine inactive LLLW tank liquid level trends as a function of time.

7334 (ORNL/TM–12708) **Removal of cesium from aluminum decladding wastes generated in irradiated target processing using a fixed-bed column of resorcinol-formaldehyde resin.** Brunson, R.R.; Williams, D.F.; Bond, W.D.; Benker, D.E.; Chattin, F.R.; Collins, E.D. Oak Ridge National Lab., TN (United States). Sep 1994. 21p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE95004784. Source: OSTI; NTIS; INIS; GPO Dep.

The removal of cesium (Cs) from a low-level liquid waste (LLLW) with a cation-exchange column was demonstrated using a resorcinol-formaldehyde (RF) resin. The RF resin was developed at the Westinghouse Savannah River Laboratory (SRL) and is highly specific for the removal of Cs from an alkaline waste of high sodium content. It was determined that the RF resin would be suitable for removing Cs, the largest gamma radiation contributor, from the LLLW generated at the Radiochemical Engineering Development Center located at the Oak Ridge National Laboratory. Presently, the disposal of the LLLW is limited due to the amount of Cs contained in the waste. Cesium removal from the waste solution offers immediate benefits by conserving valuable tank space and would allow cask shipments of the treated waste should the present Laboratory pipelines become unavailable in the future. Preliminary laboratory tests of the RF resins, supplied from two different sources, were used to design a full-scale cation-exchange column for the removal of Cs from a Mark 42 SRL fuel element dejacketing waste solution. The in-cell tests reproduced the preliminary bench-scale test results. The initial Cs breakthrough range was 85–92 column volumes (CV). The resin capacity for Cs was found to be ~0.35 meq per gram of resin. A 1.5-liter resin bed loaded a combined ~1,300 Ci of ^{134}Cs and ^{137}Cs. A distribution coefficient of ~110 CV was determined, based on a 50% Cs breakthrough point. The kinetics of the system was studied by examining the rate parameters; however, it was decided that several more tests would be necessary to define the mass transfer characteristics of the system.

7335 (ORNL/TM–12823) **Bench-scale treatability studies for simulated incinerator scrubber blowdown containing radioactive cesium and strontium.** Coroneos, A.C. (Oak Ridge National Lab., TN (United States)); Taylor, P.A.; Arnold, W.D. Jr.; Bostick, D.A.; Perona, J.J. Oak Ridge National Lab., TN (United States). Dec 1994. 43p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE95005997. Source: OSTI; NTIS; INIS; GPO Dep.

The purpose of this report is to document the results of bench-scale testing completed to remove ^{137}Cs and ^{90}Sr from the Oak Ridge K-25 Site Toxic Substances Control Act (TSCA) Incinerator blowdown at the K-25 Site Central Neutralization Facility, a wastewater treatment facility designed to remove heavy metals and uranium from various wastewaters. The report presents results of bench-scale testing using chabazite and clinoptilolite zeolites to remove cesium and strontium; using potassium cobalt ferrocyanide (KCCF) to remove cesium; and using strontium chloride coprecipitation, sodium phosphate coprecipitation, and calcium sulfate coprecipitation to remove strontium. Low-range, average-range, and high-range concentration blowdown surrogates were used to complete the bench-scale testing.

7336 (ORNL/TM–12828) **Operating cost guidelines for benchmarking DOE thermal treatment systems for low-level mixed waste.** Salmon, R.; Loghry, S.L.; Hermes, W.H. Oak Ridge National Lab., TN (United States). Nov 1994. 44p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE95004734. Source: OSTI; NTIS; INIS; GPO Dep.

This report presents guidelines for estimating operating costs for use in benchmarking US Department of Energy (DOE) low-level mixed waste thermal treatment systems. The guidelines are based on operating cost experience at the DOE Toxic Substances Control Act (TSCA) mixed waste incinerator at the K-25 Site at Oak Ridge. In presenting these guidelines, it should be made clear at the outset that it is not the intention of this report to present operating cost estimates for new technologies, but only guidelines for estimating such costs.

7337 **Slanted baffle mist eliminator.** Vance, R.F. 1992. Filed date 28 Oct 1992. U.S. Patent Application 7-967,463. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC07-81NE44139. Order Number DE95006138. Source: OSTI; NTIS (US Sales Only); GPO Dep.

This invention is comprised of an apparatus for the elimination of mist from off-gas during vitrification of nuclear waste, where baffles are installed on a slant toward the flow of the off-gasses eliminating the need to expand the cross-sectional area of the duct size.

7338 (PNL–10134) **Tank waste processing analysis: Database development, tank-by-tank processing requirements, and examples of pretreatment sequences and schedules as applied to Hanford Double-Shell Tank Supernatant Waste - FY 1993.** Colton, N.G. (Pacific Northwest Lab., Richland, WA (United States)); Orth, R.J.; Aitken, E.A. Pacific Northwest Lab., Richland, WA (United States). Sep 1994. 63p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. Order Number DE95005754. Source: OSTI; NTIS; INIS; GPO Dep.

This report gives the results of work conducted in FY 1993 by the Tank Waste Processing Analysis Task for the Underground Storage Tank Integrated Demonstration. The main purpose of this task, led by Pacific Northwest Laboratory, is to demonstrate a methodology to identify processing sequences, i.e., the order in which a tank should be processed. In turn, these sequences may be used to assist in the development of time-phased deployment schedules. Time-phased deployment is implementation of pretreatment technologies over a period of time as technologies are required and/or developed. The work discussed here illustrates how tank-by-tank databases and processing requirements have been used to generate processing sequences and time-phased deployment schedules. The processing sequences take into account requirements such as the amount and types of data available for the tanks, tank waste form and composition, required decontamination factors, and types of compact processing units (CPUS) required and technology availability. These sequences were developed from processing requirements for the tanks, which were determined from spreadsheet analyses. The spreadsheet analysis program was generated by this task in FY 1993. Efforts conducted for this task have focused on the processing requirements for Hanford double-shell tank (DST) supernatant wastes (pumpable liquid) because this waste type is easier to retrieve than the other types (saltcake and sludge), and more tank space would become available for future processing needs. The processing requirements were based on Class A criteria set by the U.S. Nuclear Regulatory Commission and Clean Option goals provided by Pacific Northwest Laboratory.

7339 (PNL–10173) **Ammonia in simulated Hanford double-shell tank wastes: Solubility and effects on surface tension.** Norton, J.D.; Pederson, L.R. Pacific Northwest Lab., Richland, WA (United States). Sep 1994. 64p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. Order Number DE95002322. Source: OSTI; NTIS; INIS; GPO Dep.

Radioactive and wastes left from defense materials production activities are temporarily stored in large underground tanks at the Hanford Site in south central Washington State (Tank Waste Science Panel 1991). Some of these wastes are in the form of a thick slurry ("double-shell slurry") containing sodium nitrate, sodium nitrite, sodium aluminate, sodium hydroxide, sodium carbonate, organic complexants and buffering agents, complexant fragments and other minor components (Herting et al. 1992a; Herting et al. 1992b; Campbell et al. 1994). As a result of thermal and radiolytic processes, a number of gases are known to be produced by some of these stored wastes, including ammonia, nitrous oxide, nitrogen, hydrogen, and methane (Babad et al. 1991; Ashby et al. 1992; Meisel et al. 1993; Ashby et al. 1993; Ashby et al. 1994; Bryan et al. 1993; US Department of Energy 1994). Before the emplacement of a mixer pump, these gases were retained in and periodically released from Tank 241-SY-101, a double-shell tank at the Hanford Site (Babad et al. 1992; US Department of Energy 1994). Gases are believed to be retained primarily in the form of bubbles attached to solid particles (Bryan, Pederson, and Scheele 1992), with very little actually dissolved in the liquid. Ammonia is

an exception. The relation between the concentration of aqueous ammonia in such concentrated, caustic mixtures and the ammonia partial pressure is not well known, however.

7340 (PNL–10176) **A survey of existing and emerging technologies for external detection of liquid leaks at the Hanford Site.** Lewis, R.E.; Teel, S.S. Pacific Northwest Lab., Richland, WA (United States). Oct 1994. 81p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. Order Number DE95002585. Source: OSTI; NTIS; INIS; GPO Dep.

Contains 1 disk.

During the history of the Hanford Site, many structures were built that stored and transported liquids used for the production mission; some of these structures are still active. Active structures include underground storage tanks retention basins, and pipes and pipelines. Many of the liquids stored and transported in these structures are potentially hazardous to human health and the environment. Any leakage of liquids from active structures, has the added potential to mobilize contaminants in the unsaturated zone. Therefore, it is beneficial to monitor these structures for leaks. The purpose of tills report is to catalog existing and emerging technologies that have potential for the external monitoring of liquid leaks. The report will focus primarily on the needs at the Hanford Site tank farms that are located in the 200 Areas, but will also be relevant to other Hanford Site facilities. Leak detection systems, both external and internal, are currently used at some Hanford facilities. This report focuses on the detection of leaks as they migrate into the soils surrounding the facilities.

7341 (PNL–10194) **Hanford Permanent Isolation Barrier Program: Asphalt technology data and status report - FY 1994.** Freeman, H.D.; Romine, R.A.; Zacher, A.H. Pacific Northwest Lab., Richland, WA (United States). Sep 1994. 40p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. Order Number DE95005752. Source: OSTI; NTIS; INIS; GPO Dep.

The asphalt layer within the Hanford Permanent Isolation Barrier (HPIB) is an important component of the overall design. This layer provides a RCRA equivalent backup to the overlying earthen layers in the unlikely event that these layers are not able to reduce the infiltration rate to less than 0.05 cm/yr. There is only limited amount of information on using asphalt for a moisture infiltration barrier over the long times required by the HPIB. Therefore, a number of activities are under way, as part of the Barrier Development Program, to obtain data on the performance of asphalt as a moisture barrier in a buried environment over a 1000-year period. These activities include (1) determining RCRA equivalency, (2) measurement of physical properties, (3) measurement of aging characteristics, and (4) relationship to ancient asphalt analogs. During FY 1994 progress was made on all of these activities. Studies were conducted both in the laboratory and on the prototype barrier constructed over the 216-B-57 crib in the 200 East Area on the Hanford Site. This report presents results obtained from the asphalt technology tasks during FY 1994. Also included are updates to planned activities for asphalt analogs and monitoring the asphalt test pad near the prototype barrier. Measurements of hydraulic conductivity on the HMAC portion of the prototype barrier show that the asphalt layers easily meet the RCRA standard of 1×10^{-7} cm/s. In-place measurements using a new field falling head technique show an average of 3.66×10^{-8} cm/s, while cores taken from the north end of the prototype and measured in a laboratory setup averaged 1.29×10^{-9} cm/s. Measurements made on the fluid applied asphalt membrane (polymer-modified asphalt) show an extremely low permeability of less than 1×10^{-11} cm/s.

7342 (PNL–10283) **Web technology in the separation of strontium and cesium from INEL-ICPP radioactive acid waste (WM-185).** Bray, L.A.; Brown, G.N. Pacific Northwest Lab., Richland, WA (United States). Jan 1995. 22p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. Order Number DE95006368. Source: OSTI; NTIS; INIS; GPO Dep.

Strontium and cesium were successfully removed from radioactive acidic waste (WM-185) at the Idaho National Engineering Laboratory, Idaho Chemical Processing Plant (ICPP), with web technology from 3M and IBC Advanced Technologies, Inc. (IBC). A technical team from Pacific Northwest Laboratory, ICPP, 3M and IBC conducted a very successful series of experiments from August 15 through 18, 1994. The ICPP, Remote Analytical Laboratory, Idaho Falls, Idaho, provided the hot cell facilities and staff to complete these milestone experiments. The actual waste experiments duplicated the initial 'cold' simulated waste results and confirmed the selective removal provided by ligand-particle web technology.

7343 (PNL–10398-Vol.1) **K Basin spent fuel sludge treatment alternatives study. Volume 1, Regulatory options.** Beary, M.M. (Science Applications International Corp., Richland, WA (United States)); Honekemp, J.R.; Winters, N. Pacific Northwest Lab., Richland, WA (United States); Science Applications International Corp., Richland, WA (United States). Jan 1995. 45p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. Agreement 188694-A-A2. Order Number DE95006193. Source: OSTI; NTIS; INIS; GPO Dep.

Approximately 2100 metric tons of irradiated N Reactor fuel are stored in the KE and KW Basins at the Hanford Site, Richland, Washington. Corrosion of the fuel has led to the formation of sludges, both within the storage canisters and on the basin floors. Concern about the degraded condition of the fuel and the potential for leakage from the basins in proximity to the Columbia River has resulted in DOE's commitment in the Tri-Party Agreement (TPA) to Milestone M-34-00-T08 to remove the fuel and sludges by a December 2002 target date. To support the planning for this expedited removal action, the implications of sludge management under various scenarios are examined. Volume 1 of this two-volume report describes the regulatory options for managing the sludges, including schedule and cost impacts, and assesses strategies for establishing a preferred path.

7344 (PNL–10398-Vol.2) **K Basin spent fuel sludge treatment alternatives study. Volume 2, Technical options.** Beary, M.M. (Science Applications International Corp., Richland, WA (United States)); Honekemp, J.R.; Winters, N. Pacific Northwest Lab., Richland, WA (United States); Science Applications International Corp., Richland, WA (United States). Jan 1995. 158p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. Agreement 188694-A-A2. Order Number DE95006194. Source: OSTI; NTIS; INIS; GPO Dep.

Approximately 2100 metric tons of irradiated N Reactor fuel are stored in the KE and KW Basins at the Hanford Site, Richland, Washington. Corrosion of the fuel has led to the formation of sludges, both within the storage canisters and on the basin floors. Concern about the degraded condition of the fuel and the potential for leakage from the basins in proximity to the Columbia River has resulted in DOE's commitment in the Tri-Party Agreement (TPA) to Milestone M-34-00-T08 to remove the fuel and sludges by a December 2002 target date. To support the planning for this expedited removal action, the implications of sludge management under various scenarios are examined. This report, Volume 2 of two volumes, describes the technical options for managing the sludges, including schedule and cost impacts, and assesses strategies for establishing a preferred path.

7345 (PNL-SA–21497) **Characterization of Hanford tank wastes containing ferrocyanides.** Tingey, J.M.; Matheson, J.D.; McKinley, S.G.; Jones, T.E.; Pool, K.H. Pacific Northwest Lab., Richland, WA (United States). Feb 1993. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-940225–126: Waste management '94, Tucson, AZ (United States), 27 Feb - 3 mar 1994). Order Number DE95004561. Source: OSTI; NTIS; INIS; GPO Dep.

Currently, 17 storage tanks on the Hanford site that are believed to contain > 1,000 gram moles (465 lbs) of ferrocyanide compounds have been identified. Seven other tanks are classified as ferrocyanide containing waste tanks, but contain less than 1,000 gram moles of ferrocyanide compounds. These seven tanks are still included as Hanford Watch List Tanks. These tanks have been declared an unreviewed safety question (USQ) because of potential thermal reactivity hazards associated with the ferrocyanide compounds and nitrate and nitrite. Hanford tanks with waste containing > 1,000 gram moles of ferrocyanide have been sampled. Extensive chemical, radiothermical, and physical characterization have been performed on these waste samples. The reactivity of these wastes were also studied using Differential Scanning Calorimetry

(DSC) and Thermogravimetric analysis. Actual tank waste samples were retrieved from tank 241-C-112 using a specially designed and equipped core-sampling truck. Only a small portion of the data obtained from this characterization effort will be reported in this paper. This report will deal primarily with the cyanide and carbon analyses, thermal analyses, and limited physical property measurements.

7346 (PNL-SA–23718) **Comparative study of Total Organic Carbon (TOC) methods for high-level mixed waste.** Baldwin, D.L. (Pacific Northwest Lab., Richland, WA (United States)); Stromatt, R.W.; Winters, W.I. Pacific Northwest Lab., Richland, WA (United States). Aug 1994. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-940815–104: International nuclear and hazardous waste management conference, Atlanta, GA (United States), 14-18 Aug 1994). Order Number DE95004900. Source: OSTI; NTIS; INIS; GPO Dep.

Hanford tank waste is a complex, nonhomogeneous sludge, slurry, or salt-cake mixture requiring robust methods for analytical characterization. While numerous total organic carbon (TOC) methods are described in the literature, no single TOC method has been found to be ideal for this caustic, high-salt, sometime high-fluoride matrix. Three TOC methods have been in use at the Pacific Northwest Laboratory, and one complementary method is in place at Westinghouse Hanford Company. All have been found to have strengths and weaknesses when applied to the Hanford tank waste problem. These TOC methods include silver-catalyzed hot persulfate wet oxidation in batch-mode with coulometry detection, two methods for high-temperature furnace oxidation with coulometry detection, and UV-catalyzed persulfate oxidation with nondispersive infrared detection. To provide comparative data on these four methods, a recovery study of carbon compounds, which are relevant to Hanford tank waste, has been performed. One major conclusion is that it is most useful to have multiple methods available for the analysis of this waste material. The comparative study is discussed, operational experience in TOC analysis from these laboratories is described, and strengths and weaknesses in the methods are summarized.

7347 (PNL-SA–23723) **Salt splitting of sodium-dominated radioactive waste using ceramic membranes.** Hollenberg, G.W. (Pacific Northwest Lab., Richland, WA (United States)); Carlson, C.D.; Virkar, A.; Joshi, A. Pacific Northwest Lab., Richland, WA (United States). Aug 1994. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-940815–103: International nuclear and hazardous waste management conference, Atlanta, GA (United States), 14-18 Aug 1994). Order Number DE95004578. Source: OSTI; NTIS; INIS; GPO Dep.

The potential for salt splitting of sodium dominated radioactive wastes by use of a ceramic membrane is reviewed. The technical basis for considering this processing technology is derived from the technology developed for battery and chlor-alkali chemical industry. Specific comparisons are made with the commercial organic membranes which are the standard in nonradioactive salt splitting. Two features of ceramic membranes are expected to be especially attractive: high tolerance to gamma irradiation and high selectivity between sodium and other ions. The objective of the salt splitting process is to separate nonradioactive sodium from contaminated sodium salts prior to other pretreatment processes in order to: (1) concentrate the waste in order to reduce the volume of subsequent additives and capacity of equipment, (2) decrease the pH of the waste in preparation for further processing, and (3) provide sodium with very low radioactivity levels for caustic washing of sludge or low level and mixed waste vitrification.

7348 (PNL-SA–23952) **A chemical model for the major electrolyte components of the Hanford waste tanks. The binary electrolytes in the system: $Na-NO_3-NO_2-SO_4-CO_3-F-PO_4-OH-Al(OH)_4-H_2O$.** Felmy, A.R.; Rustad, J.R.; Mason, M.J.; Bretonne, R. de la. Pacific Northwest Lab., Richland, WA (United States). Aug 1994. 30p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-9408168–3: American Chemical Society symposium on scientific issues related to safety treatment of waste tanks, Atlanta, GA (United States), 21-26 Aug 1994). Order Number DE95004957. Source: OSTI; NTIS; INIS; GPO Dep.

An aqueous thermodynamic model is developed, based on the equations of Pitzer, which accurately model the major binary electrolytes in the $Na-NO_3-NO_2-SO_4-CO_3-F-PO_4-OH-Al(OH)_4-H_2O$ chemical system. This model was developed both from existing data in the literature, and from new osmotic and solubility measurements made as part of this study. Some of the new experimental data developed as part of this study include measurements of osmotic coefficients for $NaNO_3$, $NaNO_2$, and Na_3PO_4 at both 50 and 100°C as well as selected measurements of NaF at 100°C. In addition, the solubility of gibbsite was measured in mixed $NaOH-NaNO_3$ solutions to determine the reliability of existing thermodynamic models of aluminum hydroxide solubility when applied to concentrated nitrate. In general the final model proposed here is valid from dilute solution to salt saturation over the temperature range 25-100°C. The accuracy of the model is tested by comparisons of the model predictions with experimental data in selected common-ion ternary systems. When necessary a few commonion ternary ion interaction parameters for the Pitzer model were developed.

7349 (PNL-SA–24027) **The solubility of $Cr(OH)_3(am)$ in concentrated NaOH and $NaOH-NaNO_3$ solutions.** Felmy, A.R.; Rai, D.; Fulton, R.W. Pacific Northwest Lab., Richland, WA (United States). Aug 1994. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-9408168–2: American Chemical Society symposium on scientific issues related to safety treatment of waste tanks, Atlanta, GA (United States), 21-26 Aug 1994). Order Number DE95004559. Source: OSTI; NTIS; INIS; GPO Dep.

Chromium is a major component of the Hanford waste tank sludges, and the presence of Cr in the sludges is a significant concern in the disposal of these sludges because Cr can interfere with the formation of waste glasses. One of the current pretreatment strategies for removing constituents that can interfere with glass formation, such as P and Cr, is to wash/dissolve the sludges in basic NaOH solutions. The solubility of $Cr(OH)_3(am)$ was measured in concentrated NaOH ranging in concentration from 0.1M to 6.0M and in $NaOH-NaNO_3$ solutions with fixed NaOH concentration and variable $NaNO_3$ concentration at room temperature (22–23 C). Equilibrium between solids and solutions was approached relatively slowly and required approximately 60–70 days before steady-state concentrations were reached. A thermodynamic model, based upon the Pitzer equations, was developed from the solubility data in NaOH, which includes only two aqueous Cr species ($Cr(OH)_4^-$ and $NaCr(OH)_4(aq)$) and ion-interaction parameters for Na^+ with $Cr(OH)_4^-$. This model was then tested in the mixed $NaOH-NaNO_3$ solutions and found to be reliable.

7350 (PNL-SA–24672) **Vitrification of high sulfate wastes.** Merrill, R.A.; Whittington, K.F.; Peters, R.D. Pacific Northwest Lab., Richland, WA (United States). Sep 1994. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-9409178–12: American Chemical Society meeting on industrial and engineering chemistry, Atlanta, GA (United States), 19-21 Sep 1994). Order Number DE95004560. Source: OSTI; NTIS; INIS; GPO Dep.

The US Department of Energy (DOE) through the Mixed Waste Integrated Program (MWIP) is investigating the application of vitrification technology to mixed wastes within the DOE system This work involves identifying waste streams, laboratory testing to identify glass formulations and characterize the vitrified product, and demonstration testing with the actual waste in a pilot-scale system. Part of this program is investigating process limits for various waste components, specifically those components that typically create problems for the application of vitrification, such as sulfate, chloride, and phosphate. This work describes results from vitrification testing for a high-sulfate waste, the 183-H Solar Evaporation Basin waste at Hanford. A low melting phosphate glass formulation has been developed for a waste stream high in sodium and sulfate. At melt temperatures in the range of 1,000 C to 1,200 C, sulfate in the waste is decomposed to gaseous oxides and driven off during melting, while the remainder of the oxides stay in the melt. Decomposition of the sulfates eliminates the processing problems typically

encountered in vitrification of sulfate-containing wastes, resulting in separation of the sulfate from the remainder of the waste and allowing the sulfate to be collected in the off-gas system and treated as a secondary waste stream. Both the vitreous product and intentionally devitrified samples are durable when compared to reference glasses by TCLP and DI water leach tests. Simple, short tests to evaluate the compatibility of the glasses with potential melter materials found minimal corrosion with most materials.

7351 (PNL-SA–24698) **Organic destruction to enhance the separation of strontium in radioactive wastes.** Schmidt, A.J.; Elmore, M.R.; Orth, R.J.; Jones, E.O.; Zacher, A.H.; Hart, T.R.; Neuenschwander, G.G.; Poshusta, J.C. Pacific Northwest Lab., Richland, WA (United States). Oct 1994. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-941016–2: Materials week '94, Rosemont, IL (United States), 3-7 Oct 1994). Order Number DE95004926. Source: OSTI; NTIS; INIS; GPO Dep.

A low-temperature (300 C to 375 C) hydrothermal organic destruction process is being evaluated to help facilitate the removal of complexed radioactive species from bulk liquid components in Hanford tank waste. The work focuses on hydrothermal processing to destroy organic compounds that contribute to waste safety issues and organic complexants that promote the solubility of radioactive constituents such as ^{90}Sr and ^{241}Am. For the studies discussed here, testing was conducted using a nonradioactive Hanford tank waste simulant. The relative destruction rates of a variety of organic compounds known to be present in Hanford tank waste were evaluated. In addition, the tendency for these organic compounds to complex strontium and the effect of hydrothermal treatment on strontium removal were investigated.

7352 (PNL-SA–24741) **Analysis of radioactive waste samples by ion chromatography-ICP/MS.** Farmer, O.T. III; Reeves, J.H.; Wyse, E.J.; Clemeston, C.J.; Barinaga, C.J.; Smith, M.R.; Koppenaal, D.W. Pacific Northwest Lab., Richland, WA (United States). Oct 1994. 22p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-9410147–3: 35. ORNL/DOE analytical chemistry in energy technology conference, Gatlinburg, TN (United States), 6-8 Oct 1994). Order Number DE95004936. Source: OSTI; NTIS; INIS; GPO Dep.

A comprehensive ion chromatography (IC) with beta-counting (beta) and inductively coupled plasma mass spectrometry (ICP/MS) detection approach has been developed to separate and detect 20 radionuclides in a Hanford waste tank sample. The IC separation was performed using a multi-functional group (anion/cation) resin and eluents of oxalic acid, diglycolic acid, and hydrochloric acid. Shorter-lived radionuclides were detected by a solid-state beta scintillation counter on-line with the IC separation. Mass spectrometry detection using an efficient and robust plasma ionization source provides isotopic discernability for both stable isotopes and long-lived radioactive species. Effective separation of over 47 elements and 160 isotopes was obtained from a single-elution scheme lasting 70 min. Automated IC separations provide the potential for rapid isotopic and radionuclide analysis of complex radioactive waste, using minimal sample and reagent volumes and reducing personnel exposures.

7353 (PNL-SA–25050) **Parametric design using IGRIP.** Baker, C. (Pacific Northwest Lab., Richland, WA (United States). Applied Physics Center). Pacific Northwest Lab., Richland, WA (United States). Oct 1994. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-9410231–2: 8. Deneb user group meeting, Detroit, MI (United States), 10-14 Oct 1994). Order Number DE95004937. Source: OSTI; NTIS; INIS; GPO Dep.

The Department of Energy's (DOE) Hanford site near Richland, Washington is being cleaned up after 50 years of nuclear materials production. One of the most serious problems at the site is the waste stored in single-shell underground storage tanks. There are 149 of these tanks containing the spent fuel residue remaining after the fuel is dissolved in acid and the desired materials (primarily plutonium and uranium) are separated out. The tanks are upright cylinders 75 ft. in diameter with domed tops. They are made of reinforced concrete, have steel liners, and each tank is buried under 7–12 ft. of overburden. The tanks are up to 40-ft. high, and have capacities of 500,000, 750,000, or 1,000,000 gallons of waste. As many as one-third of these tanks are known or suspected to leak. The waste form contained in the tanks varies in consistency from liquid supernatant to peanut-butter-like gels and sludges to hard salt cake (perhaps as hard as low-grade concrete). The current waste retrieval plan is to insert a large long-reach manipulator through a hole cut in the top of the tank, and use a variety of end-effectors to mobilize the waste and remove it from the tank. PNL has, with the assistance of Deneb robotics employees, developed a means of using the IGRIP code to perform parametric design of mechanical systems. This method requires no modifications to the IGRIP code, and all design data are stored in the IGRIP workcell. The method is presented in the context of development of a passive articulated mechanism that is used to deliver down-arm services to a gantry robot. The method is completely general, however, and could be used to design a fully articulated manipulator. Briefly, the method involves using IGCALC expressions to control manipulator joint angles, and IGCALC variables to allow user control of link lengths and offsets. This paper presents the method in detail, with examples drawn from PNL's experience with the gantry robot service-providing mechanism.

7354 (PSI-PROC–92-02, pp. 83-103) **Technical policy with radioactive wastes management.** Chuvilo, I.V. (Inst.for Theoretical and Experimental Physics, Moscow (Russian Federation)). No corporate text available. Sep 1992. 657p. (CONF-9109524–: Specialists' meeting on accelerator-based transmutation, Villigen (Switzerland), 9-12 Sep 1991). In *Proceedings of the specialists' meeting on accelerator-based transmutation.* Order Number DE94612272.

This work discusses in details the possibilities of handling radioactive wastes. Burying of radioactive wastes into geological formation or near surface storages has its own risks taking into account the long-time prognosis of ecological, geological, hydrological and constructing requirements. Other alternatives suggested are isolation of wastes in the space through rocket-system, self heating of the waste resulting in self-burying into the depth of earth rocks and nuclear transmutation of long-lived, high level wastes in accelerators or nuclear reactors. Transmutation of radioactive nuclei is discussed in detail here.

7355 (PSI-PROC–92-02, pp. 297-317) **Large-scale future nuclear power and the problem of RAW handling.** Orlov, V.V. (PDIPE-NIKIET, Moscow (Russian Federation)); Ganev, I.K.; Naumov, V.V.; Tochenij, L.V.; Lopatkin, A.V. No corporate text available. Sep 1992. 657p. (CONF-9109524–: Specialists' meeting on accelerator-based transmutation, Villigen (Switzerland), 9-12 Sep 1991). In *Proceedings of the specialists' meeting on accelerator-based transmutation.* Order Number DE94612272.

This work gives the advantages of nuclear power over non-nuclear power. It discusses in details the type of radioactive waste produced due to nuclear power generation. Radioactive wastes can be classified as long-lived and middle lived wastes. Waste of these categories comprise mostly of fission products, structural materials and residue actinides. Hazard of radioactive waste, particularly long-lived radioactive wastes can be reduced by transmutation, compacting waste for storage and by following the rules of waste disposal strictly.

7356 (SAND–95-8002) **Pollution prevention opportunity assessment for Building 922 solid office waste.** Phillips, N.M. (Sandia National Labs., Livermore, CA (United States). Environmental Protection Dept.). Sandia National Labs., Livermore, CA (United States). Jan 1995. 18p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. Order Number DE95006199. Source: OSTI; NTIS; INIS; GPO Dep.

Building 922 houses all of SNL/California's ES and H Departments: Health Protection, Environmental Protection, Safety, and Environmental Operations. It covers approximately 10,000 square feet and houses about 80 people. The office personnel generate nonhazardous solid office wastes in their daily activities. To determine the types and amounts of waste generated, a special PPOA sorting team sorted all of the trash collected from the building for a

period of one-week (including paper and aluminum cans in the recycling bins). The team sorted the trash into major categories: paper, plastic, metals, glass, wet garbage, rest room waste, and miscellaneous materials. They then sorted it into subcategories within each major category. Rest room waste was collected but not sorted. The waste in each category was weighed separately. The total amount of trash collected during the week was approximately 168.8 kg (371.4 lbs). The results of this PPOA indicate that SNL/California is minimizing most nonhazardous office waste and reductions planned for the near future will add significantly to the minimization efforts.

7357 (SAND–95-8007) **Pollution prevention opportunity assessment for the SNL/California waste management facilities.** Braye, S. (Sandia National Labs., Livermore, CA (United States). Environmental Protection Dept.); Phillips, N.M. Sandia National Labs., Livermore, CA (United States). Jan 1995. 30p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. Order Number DE95006200. Source: OSTI; NTIS; INIS; GPO Dep.

SNL/California's waste management facilities, Bldgs. 961 and 962-2, generate a secondary stream of hazardous and radioactive waste. This waste stream is generated mainly during the processing and handling of hazardous, radioactive, and mixed wastes (primary waste stream), which are generated by the laboratories, and when cleaning up spills. The secondary waste stream begins with the removal of a generator's hazardous, radioactive, and mixed waste from specified collection areas. The waste stream ends when the containers of processed waste are loaded for shipment off-site. The total amount of secondary hazardous waste generated in the waste management facilities from January 1993 to July 1994 was 1,160.6 kg. The total amount of secondary radioactive waste generated during the same period was 1,528.8 kg (with an activity of 0.070 mCi). Mixed waste usually is not generated in the secondary waste stream. This pollution prevention opportunity assessment (PPOA) was conducted using the graded approach methodology developed by the Department of Energy (DOE) PPOA task group. The original method was modified to accommodate the needs of Sandia's site-specific processes. The options generated for potential hazardous waste minimization, cost savings, and environmental health and safety were the result of a waste minimization team effort. The results of the team efforts are summarized.

7358 (SKB-TR–94-04) **Final report of the AECL/SKB Cigar Lake analog study.** Cramer, J. (ed.) (Atomic Energy of Canada Ltd. Research, Pinawa, MB (Canada). Whiteshell Labs.); Smellie, J. (ed.). Swedish Nuclear Fuel and Waste Management Co., Stockholm (Sweden). May 1994. 402p. (AECL–10851; COG–93-147.). Order Number DE95613252. Source: OSTI; NTIS; INIS.

The Cigar Lake uranium deposit is located in northern Saskatchewan, Canada. The 1.3-billion-year-old deposit is located at a depth of about 450 m below surface in a water-saturated sandstone at the unconformity contact with the high-grade metamorphic rocks of the Canadian Shield. The Cigar Lake deposit has many features that parallel those being considered within the Canadian concept for disposal of nuclear fuel waste. The study of these natural structures and processes provides valuable insight toward the eventual design and site selection of a nuclear fuel waste repository. The main feature of this analog is the absence of any indication on the surface of the rich uranium ore 450 m below. This indicates that the combination of natural barriers has been effective in isolating the uranium ore from the surface environment. More specifically, the deposit provides analog information relevant to the stability of UO_2 fuel waste, the performance of clay-based barriers, radionuclide migration, colloid formation, radiolysis, fission-product geochemistry and general aspects of water-rock interaction. The main geochemical studies on this deposit focus on the evolution of groundwater compositions in the deposit and on their redox chemistry with respect to the uranium, iron and sulphide systems. Since 1984, through cooperation from the owners of the Cigar Lake deposit, analog studies have been conducted. AECL, with support from Ontario Hydro under the auspices of the CANDU Owners Group, initiated international participation in 1989 through collaboration with the Swedish Nuclear Fuel and Waste Management Company (SKB) and, more recently, with the Los Alamos National Laboratory (LANL).

7359 (SKB-TR–94-08) **The structure of conceptual models with application to the Aespoe HRL project.** Olsson, Olle (Conterra AB, Uppsala (Sweden)); Baeckblom, G.; Wikberg, P.; Gustafson, G.; Rhen, I.; Stanfors, R. Swedish Nuclear Fuel and Waste Management Co., Stockholm (Sweden). May 1994. 23p. Order Number DE95613253. Source: OSTI; NTIS; INIS.

In performance assessment a sequence of models is used to describe the function of the geological barrier. This report proposes a general structure and terminology for description of these models. A model description consists of the following components: A conceptual model which defines the geometric framework in which the problem is solved, the dimensions of the modelled volume, descriptions of the processes included in the model, and the boundary conditions; Data which are introduced into the conceptual model, and a mathematical or numerical tool used to produce output data. Contradictory to common practice in geohydrologic modelling it is proposed that the term conceptual model is restricted to define in what way the model is constructed, and that this is separated from any specific application of the conceptual model. Hence, the conceptual model should not include any specific data. 5 refs, 2 figs, 4 tabs.

7360 (SKB-TR–94-11) **Aespoe Hard Rock Laboratory. Annual Report 1993.** Swedish Nuclear Fuel and Waste Management Co., Stockholm (Sweden). Jun 1994. 82p. Order Number DE95616117. Source: OSTI; NTIS; INIS.

The Aespoe Hard Rock Laboratory is being constructed in preparation for the deep geological repository of spent fuel in Sweden. This Annual Report 1993 for the Aespoe Hard Rock Laboratory contains an overview of the work conducted. Present work is focused on verification of pre-investigation methods and development of the detailed investigation methodology. Construction of the facility and investigation of the bedrock are carried out in parallel. As of December 1993, 2760 m of the tunnel had been excavated to a depth of 370 m below the surface. An important and integral part of the work is further refinement of conceptual and numerical models for groundwater flow and radionuclide migration. Detailed plans have been prepared for several experiments to be conducted after the end of the construction work. Eight organizations from seven countries are now participating in the work at the Aespoe Hard Rock Laboratory and are contributing in different ways to the results being achieved.

7361 (SKB-TR–94-14) **Performance of the SKB copper/steel canister.** Widen, H. (Kemakta Konsult AB, Stockholm (Sweden)); Sellin, P. Swedish Nuclear Fuel and Waste Management Co., Stockholm (Sweden). Sep 1994. 59p. Order Number DE95613254. Source: OSTI; NTIS; INIS.

The performance of the SKB copper/steel canister has been analyzed. The present knowledge of long-term function of the canister is summarized. Radionuclide release calculations for a reference failure scenario and the effect of some variations on release rates are shown. The Features, Events and Processes (FEPs) that are affecting the studied scenarios have been classified according to the 'Rock Engineering Systems' methodology as defined by SKB for the copper/steel canister. Radionuclide release rate is calculated for a reference failure scenario where a small hole in the weld of the outer copper overpack is assumed to exist at the time of deposition. The hole in the copper overpack is assumed to be of a constant size until the inner steel canister looses its mechanical integrity. The steel is assumed to maintain mechanical stability during 5000 years and after this time period the hole through the copper is assumed to be 0.1 m^2, which translate to insignificant transport resistance from the canister wall. The release rates for C-14, Sr-90, I-129, Cs-137, Pu-239 and Am-241 are calculated for the reference failure scenario and for a number of variations. The variations include glaciation, only few of the Zircaloy tubes damaged, different canister filling materials, variations in sorption properties of the bentonite clay and different life-time of the inner steel canister. The performance of the canister and near-field, concerning the release rates of the studied radionuclides, is as expected, comparable to the release rates obtained in SKB 91. 11 refs, figs, tabs.

7362 (SSI–94-07) **Radioactive waste in the Russian Federation.** Grundfelt, B. (Kemakta Konsult AB, Stockholm (Sweden)); Lindbom, B. Swedish Radiation Protection Inst., Stockholm (Sweden). 20 Aug 1994. 35p. (KEMAKTA-AR–94-06.). Order Number DE95613234. Source: OSTI; NTIS; INIS.

The present report has been produced by Kemakta Consultants Co. under contract from the Swedish Radiation Protection Institute (SSI). The purpose of the study is to give a broad overview of the situation in the Russian Federation with regard to the production and management of radioactive waste. The report also presents an outline of possible risks for environmental and societal consequences of the current waste management practices. The study is intended to be used as a basis for discussions regarding possible international cooperative efforts for improving the waste management system in Russia. The report is mainly based on publicly available literature. In addition, information has been obtained during a two-day visit to the Bochvar Institute and the Russian Atomic Power Ministry, MinAtom, in Moscow. Complementary information has been provided by MinAtom in response to a questionnaire that was sent to MinAtom subsequent to the visit to Moscow. Staff at the Russian embassy in Stockholm has assisted in the organisation of contacts as well as with various clarifications and translations. Some of the information in this report has not been officially confirmed by the Russian authorities. 17 refs, 4 figs, 7 tabs.

7363 (UCRL-CR–117355) **Mixed Waste Management Facility Preliminary Safety Analysis Report. Chapters 1 to 20.** Lawrence Livermore National Lab., CA (United States); Weston (Roy F.), Inc./Vectra Government Services, Inc. (United States). Sep 1994. 505p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. Order Number DE95005973. Source: OSTI; NTIS; INIS; GPO Dep.

This document provides information on waste management practices, occupational safety, and a site characterization of the Lawrence Livermore National Laboratory. A facility description, safety engineering analysis, mixed waste processing techniques, and auxiliary support systems are included.

7364 (UCRL-ID–117120) **Decision and systems analysis for underground storage tank waste retrieval systems and tank waste remediation system.** Bitz, D.A. (Independent Consultant, Kirkland, WA (United States)); Berry, D.L.; Jardine, L.J. Lawrence Livermore National Lab., CA (United States). Mar 1994. 59p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. Order Number DE95004196. Source: OSTI; NTIS; INIS; GPO Dep.

Hanford's underground tanks (USTs) pose one of the most challenging hazardous and radioactive waste problems for the Department of Energy (DOE). Numerous schemes have been proposed for removing the waste from the USTs, but the technology options for doing this are largely unproven. To help assess the options, an Independent Review Group (IRG) was established to conduct a broad review of retrieval systems and the tank waste remediation system. The IRG consisted of the authors of this report.

7365 (UCRL-ID–118009) **Field-based tests of geochemical modeling codes using New Zealand hydrothermal systems.** Bruton, C.J.; Glassley, W.E.; Bourcier, W.L. Lawrence Livermore National Lab., CA (United States). Jun 1994. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. Order Number DE95005658. Source: OSTI; NTIS; INIS; GPO Dep.

Hydrothermal systems in the Taupo Volcanic Zone, North Island, New Zealand are being used as field-based modeling exercises for the EQ3/6 geochemical modeling code package. Comparisons of the observed state and evolution of the hydrothermal systems with predictions of fluid-solid equilibria made using geochemical modeling codes will determine how the codes can be used to predict the chemical and mineralogical response of the environment to nuclear waste emplacement. Field-based exercises allow us to test the models on time scales unattainable in the laboratory. Preliminary predictions of mineral assemblages in equilibrium with fluids sampled from wells in the Wairakei and Kawerau geothermal field suggest that affinity-temperature diagrams must be used in conjunction with EQ6 to minimize the effect of uncertainties in thermodynamic and kinetic data on code predictions.

7366 (USGS-OFR–92-657) **Geohydrologic data collected from shallow neutron-access boreholes and resultant-preliminary geohydrologic evaluations, Yucca Mountain area, Nye County, Nevada.** Blout, D.O. (Raytheon Services Nevada, Las Vegas, NV (United States)); Hammermeister, D.P.; Loskot, C.L.; Chornack, M.P. Geological Survey, Denver, CO (United States). 1994. 147p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AI08-92NV10874. Order Number DE95005995. Source: OSTI; NTIS; INIS; U.S. Geological Survey, Earth Science Information Center, Open-File Reports Section, Box 25286, MS 517, Denver Federal Center, Denver, CO 80225; GPO Dep.

In cooperation with the US Department of Energy, 74 neutron-access boreholes were drilled in and near the southwestern part of the Nevada Test Site, Nye County, Nevada. Drilling, coring, sample collection and handling, and lithologic and preliminary geohydrologic data are presented in this report. The boreholes were drilled in a combination of alluvium/colluvium, ash-flow tuff, ash-fall tuff, or bedded tuff to depths of 4.6 to 36.6 meters. Air was used as a drilling medium to minimize disturbance of the water content and water potential of drill cuttings, core, and formation rock. Drill cuttings were collected at approximately 0.6-meter intervals. Core was taken at selected intervals from the alluvium/colluvium using drive-coring methods and from tuff using rotary-coring methods. Nonwelded and bedded tuffs were continuously cored using rotary-coring methods. Gravimetric water-content and water-potential values of core generally were greater than those of corresponding drill cuttings. Gravimetric water-content, porosity, and water-potential values of samples generally decreased, and bulk density values increased, as the degree of welding increased. Grain-density values remained fairly constant with changes in the degree of welding. A high degree of spatial variability in water-content and water-potential profiles was noted in closely spaced boreholes that penetrate similar lithologic subunits and was also noted in adjacent boreholes located in different topographic positions. Variability within a thick lithologic unit usually was small. 18 refs., 21 figs., 17 tabs.

7367 (WHC-EP–0809) **Potential tank waste material anomalies located near the liquid observation wells: Model predicted responses of a neutron moisture detection system.** Finfrock, S.H.; Toffer, H.; Watson, W.T. Westinghouse Hanford Co., Richland, WA (United States). Sep 1994. 62p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95002106. Source: OSTI; NTIS; INIS; GPO Dep.

Extensive analyses have been completed to demonstrate that a neutron moisture probe can be used to recognize anomalies in materials and geometry surrounding the liquid observation wells (LOWs). Furthermore, techniques can be developed that will permit the interpretation of detector readings, perturbed by the presence of anomalies, as more accurate moisture concentrations. This analysis effort extends the usefulness of a neutron moisture probe system significantly, especially in the complicated geometries and material conditions that may be encountered in the waste tanks. Both static-source and pulsed-source neutron probes were considered in the analyses. Four different detector configurations were investigated: Thermal and epithermal neutron detectors located in both the near and far field.

7368 (WHC-EP–0829) **Estimation and characterization of decontamination and decommissioning solid waste expected from the Plutonium Finishing Plant.** Millar, J.S. (and others); Pottmeyer, J.A.; Stratton, T.J. Westinghouse Hanford Co., Richland, WA (United States). Jan 1995. 236p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95005056. Source: OSTI; NTIS; INIS; GPO Dep.

Purpose of the study was to estimate the amounts of equipment and other materials that are candidates for removal and subsequent processing in a solid waste facility when the Hanford Plutonium Finishing Plant is decontaminated and decommissioned. (Building structure and soil are not covered.) Results indicate that ~5,500 m^3 of solid waste is expected to result from the decontamination and decommissioning of the Pu Finishing Plant. The breakdown of the volumes and percentages of waste by category

is 1% dangerous solid waste, 71% low-level waste, 21% transuranic waste, 7% transuranic mixed waste.

7369 (WHC-EP–0832) **Chemistry of proposed calcination/dissolution processing of Hanford Site tank wastes.** Delegard, C.H. Westinghouse Hanford Co., Richland, WA (United States). Jan 1995. 80p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95005982. Source: OSTI; NTIS; INIS; GPO Dep.

Plans exist to separate radioactive waste stored in underground tanks at the US Department of Energy's Hanford Site in south central Washington State into low-level and high-level fractions, and to immobilize the separate fractions in high-integrity vitrified forms for long-term disposal. Calcination with water dissolution has been proposed as a possible treatment for achieving low/high-level separation. Chemistry development activities conducted since 1992 with simulated and genuine tank waste show that calcination/dissolution destroys organic carbon and converts nitrate and nitrite to hydroxide and benign offgases. The process also dissolves significant quantities of bulk chemicals (aluminum, chromium, and phosphate), allowing their redistribution from the high-level to the low-level fraction. Present studies of the chemistry of calcination/dissolution processing of genuine wastes, conducted in the period October 1993 to September 1994, show the importance of sodium fluoride phosphate double salt in controlling phosphate dissolution. Peptization of waste solids is of concern if extensive washing occurs. Strongly oxidizing conditions imposed by calcination reactions were found to convert transition metals to soluble anions in the order chromate > manganate > > ferrate. In analogy with manganese behavior, plutonium dissolution, presumably by oxidation to more soluble anionic species, also occurs by calcination/dissolution. Methods to remove plutonium from the product low-level solution stream must be developed.

7370 (WHC-EP–0839) **Summary of fiscal year 1994 near-infrared spectroscopy moisture sensing activities.** Reich, F.R.; Johnson, R.E.; Philipp, B.L.; Duncan, J.B.; Schutzenhofer, G.L. Westinghouse Hanford Co., Richland, WA (United States). Jan 1995. 59p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95005477. Source: OSTI; NTIS; INIS; GPO Dep.

This report summarizes the work to develop and deploy near-infrared (NIR) moisture sensing technology for application to the Hanford Site's high-level nuclear waste materials. This work is jointly supported by the U.S. Department of Energy's (DOE) EM-50 Office of Technology Development Support and the EM-30 Tank Waste Safety and Tank Waste Remediation Systems Programs. A basic NIR system was developed at the Savannah River Laboratory (SRL) with support from DOE's EM-50 Office. The application of this technology to Hanford's high-level wastes (HLW). Including deployment, is supported by DOE's EM-30 Systems Programs. The need to know the moisture content in HLW is driven by concerns for the safety of underground storage tanks that contain or are suspected of containing ferrocyanide and organic types of materials. The NIR technology has application for both ex situ (hot cell core measurements) and in situ waste tank moisture sensing. The cold test/calibration data in this report was generated as part of the total life cycle development path being followed in the development and deployment of the NIR technology at the Hanford Site.

7371 (WHC-SA–2407) **Global modeling of Hanford tank waste pretreatment alternatives within a total cleanup system using ASPEN PLUS™.** Knutson, B.J. (Westinghouse Hanford Co., Richland, WA (United States)); Jansen, G. Jr.; Zimmerman, B.D.; Niccoli, L.G.; Lauerhass, L. Westinghouse Hanford Co., Richland, WA (United States). Nov 1994. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. (CONF-9411135–3: ASPENWORLD 94, Boston, MA (United States), 6-9 Nov 1994). Order Number DE95004488. Source: OSTI; NTIS; INIS; GPO Dep.

The purpose of this work is to evaluate and compare radionuclide separations/processing technologies being developed or considered as Hanford tank waste pretreatment alternatives. These technologies are integrated into a total cleanup system that includes tank waste retrieval, treatment, and disposal. Current Hanford flowsheets typically include only mature, developed technologies, not new technologies. Thus, this work examines the impact/benefits of inserting new technologies into Hanford flowsheets. Waste treatment must produce disposal fractions which are less troublesome than the original material. Researchers seeking effective treatment methods may lack the tools or expertise to fully understand the implications of their approach in terms of secondary and tertiary waste streams or the extent to which a unique new process will affect upstream or downstream processes. This work has developed and demonstrated mass balance methods that clarify the effect of including individual processes in an integrated waste treatment system, such as the Hanford cleanup system. The methods provide a measure of treatment effectiveness and a format for the researcher to understand waste stream interrelationships and determine how a particular treatment technology can best be used in a cleanup system. A description of the Hanford tank waste cleanup model developed using the ASPEN PLUS flowsheet simulation tool is given. Important aspects of the modeling approach are discussed along with a description of how performance measures were developed and integrated within the simulation to evaluate and compare various Hanford tank waste pretreatment alternatives.

7372 (WHC-SA–2505) **Accelerated characterization of metal fuel stored in the Hanford K basins.** Makenas, B.J. (Westinghouse Hanford Co., Richland, WA (United States)); Omberg, R.P.; Lawrence, L.A.; Marschman, S.C.; Abrefah, J. Westinghouse Hanford Co., Richland, WA (United States). [1995]. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. (CONF-941207–16: Spent nuclear fuel meeting: challenges and initiatives, Salt Lake City, UT (United States), 14-16 Dec 1994). Order Number DE95004362. Source: OSTI; NTIS; INIS; GPO Dep.

Efforts are under way to gather data on the condition of the metal fuel and associated sludge stored in the water-filled Hanford K Basins. Most of the current data gathering activities are being performed in the basins without fuel movement. These techniques include a video survey of open storage canisters, determination of water/gas levels in sealed canisters, sampling of gas and water from sealed canisters (for chemical analysis) and measurement of sludge depth and sludge volume.

7373 (WHC-SD-L225-ATP–001) **Acceptance test procedure for the MO-294 Building.** McKenna, P.J. Westinghouse Hanford Co., Richland, WA (United States). [1995]. 24p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95004786. Source: OSTI; NTIS; INIS; GPO Dep.

This supporting document provides the Acceptance Test Procedure (ATP) for the acceptance and testing of the fire alarm system of mobile office MO-294.

7374 (WHC-SD-LEF-TS–001) **200 Area treated effluent disposal facility operational test specification.** Crane, A.F. Westinghouse Hanford Co., Richland, WA (United States). 12 Jan 1995. 25p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95005462. Source: OSTI; NTIS; INIS; GPO Dep.

This document identifies the test specification and test requirements for the 200 Area Treated Effluent Disposal Facility (200 Area TEDF) operational testing activities. These operational testing activities, when completed, demonstrate the functional, operational and design requirements of the 200 Area TEDF have been met.

7375 (WHC-SD-NR-CSER–014-Rev.1) **Criticality safety evaluation report for the 100 KE Basin sandfilter backwash pit.** Erickson, D.G. Westinghouse Hanford Co., Richland, WA (United States). [1995]. 33p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95004753. Source: OSTI; NTIS; INIS; GPO Dep.

This analysis presents the technical basis for establishing a safe mass limit for continued operations of the KE Basin sandfilter backwash pit. The main analysis is based on a very conservative UO_2-PuO_2-H_2O system using the measured isotopic concentrations of uranium and plutonium in the sludge. Appendix C contains

analyses of the sandfilter backwash pit utilizing all verified materials presently in the pit, and gives new limits based on assumptions made.

7376 (WHC-SD-SNF-CSER–002) **Criticality safety evaluation report for K Basin filter cartridges.** Schwinkendorf, K.N. Westinghouse Hanford Co., Richland, WA (United States). [1995]. 56p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95004495. Source: OSTI; NTIS; INIS; GPO Dep.

A criticality safety evaluation of the K Basin filter cartridge assemblies has been completed to support operations without a criticality alarm system. The results show that for normal operation, the filter cartridge assembly is far below the safety limit of k_{eff} = 0.95, which is applied to plutonium systems at the Hanford Site. During normal operating conditions, uranium, plutonium, and fission and corrosion products in solution are continually accumulating in the available void spaces inside the filter cartridge medium. Currently, filter cartridge assemblies are scheduled to be replaced at six month intervals in KE Basin, and at one year intervals in KW Basin. According to available plutonium concentration data for KE Basin and data for the U/Pu ratio, it will take many times the six-month replacement time for sufficient fissionable material accumulation to take place to exceed the safety limit of k_{eff} = 0.95, especially given the conservative assumption that the presence of fission and corrosion products is ignored. Accumulation of sludge with a composition typical of that measured in the sand filter backwash pit will not lead to a k_{eff} = 0.95 value. For off-normal scenarios, it would require at least two unlikely, independent, and concurrent events to take place before the k_{eff} = 0.95 limit was exceeded. Contingencies considered include failure to replace the filter cartridge assemblies at the scheduled time resulting in additional buildup of fissionable material, the loss of geometry control from the filter cartridge assembly breaking apart and releasing the individual filter cartridges into an optimal configuration, and concentrations of plutonium at U/Pu ratios less than measured data for KE Basin, typically close to 400 according to extensive measurements in the sand filter backwash pit and plutonium production information.

7377 (WHC-SD-SNF-SARR–003) **Hydrogen production in the K-Basin ion exchange columns, modules and cartridge filters.** Westinghouse Hanford Co., Richland, WA (United States). 21 Dec 1994. 184p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95005622. Source: OSTI; NTIS; INIS; GPO Dep.

K-Basin uses ion exchange modules and ion exchange (IX) columns for removing radionuclides from the basin water. When the columns and modules are loaded, they are removed from service, drained and stored. After a few IX columns accumulate in storage, they are moved to a burial box. One of the burial box contains 33 columns and the other, six. The radionuclides act on the liquid left within and adhering to the beads to produce hydrogen. This report describes the generation rate, accumulation rate and significance of that accumulation. This summary also highlights those major areas of concern to the external (to Westinghouse Hanford Company [WHC]) reviewers. Appendix H presents the comments made by the external reviewers and, on a separate sheet, the responses to those comments. The concerns regarding the details of the analytical approach, are addressed in Appendix H and in the appropriate section.

7378 (WHC-SD-SNF-SARR–004) **Results of falling barrier analyses.** Fox, G.L. Westinghouse Hanford Co., Richland, WA (United States). 31 Oct 1994. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95004494. Source: OSTI; NTIS; INIS; GPO Dep.

This document assesses the consequences if the isolation barrier plate is dropped and falls over on the fuel stored in the water-filled K-East basin. The water slows the rate of fall and some canister bending is expected but only a few rods, if any, would get crushed. The basin criticality calculations will not be affected.

7379 (WHC-SD-TD-CR–001) **Design criteria for the light duty utility arm system end effectors.** Pardini, A.F. Westinghouse Hanford Co., Richland, WA (United States). 3 Jan 1995. 15p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95005464. Source: OSTI; NTIS; INIS; GPO Dep.

This document provides the criteria for the design of end effectors that will be used as part of the Light Duty Utility Arm (LDUA) System. The LDUA System consists of a deployment vehicle, a vertical positioning mast, a light duty multi-axis robotic arm, a tank riser interface and confinement, a tool interface plate, a control system, and an operations control trailer. The criteria specified in this document will apply to all end effector systems being developed for use on or with the LDUA system at the Hanford site. The requirement stipulated in this document are mandatory.

7380 (WHC-SD-TD-ICD–001) **Light Duty Utility Arm interface control document plan.** Engstrom, J.W. Westinghouse Hanford Co., Richland, WA (United States). 27 Dec 1994. 89p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95005068. Source: OSTI; NTIS; INIS; GPO Dep.

This document describes the interface control documents that will be used to identify and control interface features throughout all phases of the Light Duty Utility Arm (LDUA) development and design. After the system is built, delivered and installed in the Cold Test Facility and later at the tank farm, the Interface Control Documents can be used in maintaining the configuration control process. The Interface Control Document will consist of Interface Control Drawings and a data base directly tied to the Interface Control Drawings. The data base can be used as an index to conveniently find interface information. Design drawings and other text documents that contain interface information will appear in the database. The Interface Control Drawings will be used to document and control the data and information that define the interface boundaries between systems, subsystems and equipment. Also, the interface boundaries will define the areas of responsibility for systems and subsystems. The drawing will delineate and identify all the physical and functional interfaces that required coordination to establish and maintain compatibility between the co-functioning equipment, computer software, and the tank farm facilities. An appendix contains the Engineering interface control database system riser manual.

7381 (WHC-SD-W007H-ATR–001) **BCP selector valves and limit switches.** Rippy, G.L. Westinghouse Hanford Co., Richland, WA (United States). 9 Jan 1995. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95005650. Source: OSTI; NTIS; INIS; GPO Dep.

This Acceptance Test Procedure (ATP) has been prepared to demonstrate that the Electrical/Instrumentation systems for the BCP stream function as required by project criteria. Specifically, the test will verify the operation of the solenoid valves and associated limit switches installed for the BCP portion of W-OO7H. This equipment is part of the B-Plant Process Condensate Treatment Facility.

7382 (WHC-SD-W025-VI–001) **Leachate storage transport tanker loadout piping.** Whitlock, R.W. Westinghouse Hanford Co., Richland, WA (United States). 5 Oct 1994. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95002083. Source: OSTI; NTIS; INIS; GPO Dep.

This report contains schematic drawings for the pipe fittings for the Hanford waste tanks. Included are the modifications to the W-025 trench #31 leachate loadout piping, and also the modifications to the tanker trailers. The piping was modified to prevent spillage to the environment. The tankers were modified for loading and unloading purposes.

7383 (WHC-SD-W049H-ICD–001-Rev.1) **200 Area TEDF interface control document.** Brown, M.J.; Hildebrand, R.A. Westinghouse Hanford Co., Richland, WA (United States). 15 Nov 1994. 85p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95004472. Source: OSTI; NTIS; INIS; GPO Dep.

Because the TEDF does not have any treatment or retention capacity, strict control at the generator interface is essential to operate the TEDF in compliance with good engineering practices, Hanford site requirements, and the 216 Discharge Permit. The information in the Interface Control Document (ICD) forms the basis of understanding between all parties involved in the TEDF; DOE,

WHC, and the generating facilities. The ICD defines the controlling document hierarchy; LEF, and generator responsibilities; monitoring and sampling requirements; and specifies the TEDF/Generator Interface points.

7384 (WHC-SD-W100-AP–002) **183-H basin sludge treatability testing program plan.** Burbank, D.A. Westinghouse Hanford Co., Richland, WA (United States). Sep 1994. 14p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95002113. Source: OSTI; NTIS; INIS; GPO Dep.

This document outlines the scope, data objectives, plan of action, responsibilities, cost and schedule of a program to perform hot treatability testing on 183-H basin sludge samples. This plan is the top-level planning document for this activity.

7385 (WHC-SD-W151-ANAL–001) **Structural evaluation of thermocouple probes for 241-AZ-101 waste tank.** Kanjilal, S.K. Westinghouse Hanford Co., Richland, WA (United States). 6 Dec 1994. 172p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95004749. Source: OSTI; NTIS; INIS; GPO Dep.

This document reports on the structural analysis of the thermocouple probe to be installed in 241-AZ-101 waste tank. The thermocouple probe is analyzed for normal pump mixing operation and potential earthquake induced loads required by the Hanford Site Design Criteria SDC-4.1.

7386 (WHC-SD-W236A-ER–008) **Engineering scale mixing system tests for MWTF title II design.** Chang, S.C. Westinghouse Hanford Co., Richland, WA (United States). 10 Oct 1994. 39p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95002144. Source: OSTI; NTIS; INIS; GPO Dep.

Mixing tests for the Multifunction Waste Tank Facility (MWTF) were conducted in 1/25 and 1/10 scale test tanks with different slurry levels, solids concentrations, different jet mixers and with simulated in-tank structures. The same test procedure was used as in the Title I program, documented in WHC-SD-W236A-ER-005. The test results support the scaling correlation derived previously in the Title I program. The tests also concluded that a partially filled tank requires less mixing power, and horizontal and angled jets in combination (H/A mixer) are significantly more effective than the two horizontal jet mixers (H/H mixer) when used for mixing slurry with a high solids concentrations.

7387 (WHC-SD-W314B-DA–002) **Tank vapor mitigation requirements for Hanford Tank Farms.** Rakestraw, L.D. Westinghouse Hanford Co., Richland, WA (United States). 15 Nov 1994. 634p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95004424. Source: OSTI; NTIS; INIS; GPO Dep.

Westinghouse Hanford Company has contracted Los Alamos Technical Associates to listing of vapors and aerosols that are or may be emitted from the High Level Waste (HLW) tanks at Hanford. Mitigation requirements under Federal and State law, as well as DOE Orders, are included in the listing. The lists will be used to support permitting activities relative to tank farm ventilation system up-grades. This task is designated Task 108 under MJB-SWV-312057 and is an extension of efforts begun under Task 53 of Purchase Order MPB-SVV-03291 5 for Mechanical Engineering Support. The results of that task, which covered only thirty-nine tanks, are repeated here to provide a single source document for vapor mitigation requirements for all 177 HLW tanks.

7388 (WHC-SD-W320-QAPP–001-Rev.1) **Project Specific Quality Assurance Plan (QAPP).** Huston, J.J. Westinghouse Hanford Co., Richland, WA (United States). Nov 1994. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95004474. Source: OSTI; NTIS; INIS; GPO Dep.

The Project QAPP's describe the program and the planned actions which WHC will implement to demonstrate and ensure that the project meets the requirements of DOE Order 5700.6C. The Project involves retrieving the high-heat waste from Tank 241-C-106 to close the safety issue associate with the tank, demonstrate initial waste retrieval technology for a Single Shell Tank, and provide feed for the Hanford Waste Vitrification Plant.

7389 (WHC-SD-W340-ES–002) **Project W-340 long reach arm retrieval system balance of plant instrumentation workshop engineering study.** Schneider, T.C. Westinghouse Hanford Co., Richland, WA (United States). Jan 1994. 17p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95004785. Source: OSTI; NTIS; INIS; GPO Dep.

This engineering study documents the results of a workshop held to resolve Issue No. 26 generated at a Arm Based Retrieval Functional Analysis Value Engineering Session. The issue deals with the scope of the Balance of Plant Instrumentation needs for the LRARS.

7390 (WHC-SD-W378-SP–001) **Low-Level Waste Vitrification Plant Project contracting strategy decision analysis report.** Felise, P.; Phillips, J.D. Westinghouse Hanford Co., Richland, WA (United States). 17 Oct 1994. 49p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95002155. Source: OSTI; NTIS; INIS; GPO Dep.

Ten basic contracting strategies were developed after a review of past strategies that had been used at the Hanford Site, other US Department of Energy (DOE) sites, other US government agencies, and in the private sector. As applicable to the Low-Level Waste Vitrification Plant (LLWVP) Project, each strategy was described and depicted in a schedule format to assess compatibility with the Hanford Federal Facility Agreement and Consent Order, al so known as the Tri-Party Agreement (Ecology et al. 1994) milestones, key decision points, and other project requirements. The-pro and con aspects of each strategy also were tabulated. Using this information as a basis, the LLWVP Project team members, along with representatives of Tank Waste Remediation System (TWRS) Engineering, TWRS Programs, and Procurement Materials Management, formed a Westinghouse Hanford Company (WHC) evaluation team to select the best strategy. Kepner-Tregoe decision analysis techniques were used in facilitated meetings to arrive at the best balanced choice.

7391 (WHC-SD-WM-ANAL–040) **242-A Evaporator ion exchange column (IX-D-1) tie down evaluation.** Hundal, T.S. Westinghouse Hanford Co., Richland, WA (United States). 23 Jan 1995. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95005991. Source: OSTI; NTIS; INIS; GPO Dep.

The existing ion exchange column in the 242-A evaporator building is not anchored to the floor slab. This equipment is a Safety Class 3 sitting in a Safety Class 2 building. The column needed to be evaluated to withstand the seismic loads. Anchor bolts have been designed to hold the column during the seismic event.

7392 (WHC-SD-WM-ATP–093) **Acceptance test procedure, 241-SY-101 Flexible Receiver System, Phase III testing.** Ritter, G.A. Westinghouse Hanford Co., Richland, WA (United States). 21 Nov 1994. 34p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95004510. Source: OSTI; NTIS; INIS; GPO Dep.

This Acceptance Test Procedure is for the 241-SY-101 Flexible Receiver System, Phase III Testing. This procedure will test the sealing integrity of the Flexible Receiver System to ensure that release of waste and aerosols will be minimized during the removal of the test mixer pump from tank SY-101.

7393 (WHC-SD-WM-ATP–113) **Inspection system performance test procedure.** Jensen, C.E. Westinghouse Hanford Co., Richland, WA (United States). 17 Jan 1995. 48p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95005989. Source: OSTI; NTIS; INIS; GPO Dep.

This procedure establishes requirements to administer a performance demonstration test. The test is to demonstrate that the double-shell tank inspection system (DSTIS) supplied by the contractor performs in accordance with the WHC-S-4108, Double-Shell Tank Ultrasonic Inspection Performance Specification, Rev. 2-A, January, 1995. The inspection system is intended to provide

ultrasonic (UT) and visual data to determine integrity of the Westinghouse Hanford Company (WHC) site underground waste tanks. The robotic inspection system consists of the following major subsystems (modules) and components: Mobile control center; Deployment module; Cable management assembly; Robot mechanism; Ultrasonic testing system; Visual testing system; Pneumatic system; Electrical system; and Control system.

7394 (WHC-SD-WM-ATR–082) **DACS upgrade acceptance test report.** Zuehlke, A.C. Westinghouse Hanford Co., Richland, WA (United States). 21 Dec 1994. 229p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95005293. Source: OSTI; NTIS; INIS; GPO Dep.

The DACS, which is housed in a trailer located just outside of the north fence at the SY tank farm, receives input signals from a variety of sensors located in and around the SY-101 tank. These sensors provide information such as: (1) tank vapor space and ventilation system H_2 concentration; (2) tank waste temperature; (3) tank pressure; (4) waste density; (5) operating pump parameters such as speed, flow, rotational position, discharge pressure, and internal temperature; (6) strain (for major equipment); and (7) waste level. The output of these sensors is conditioned and transmitted to the DACS computers where these signals are displayed, recorded, and monitored for out-of-specification conditions. If abnormal conditions are detected, then, in certain situations, the DACS automatically generates alarms and causes the system to abort pump operations. The report documents testing performed per WHC-SD-WM-ATP-082. Rev. 0-13.

7395 (WHC-SD-WM-DA–144) **Wind and seismic analysis for liquid-level gauge support.** Ziada, A.H. Westinghouse Hanford Co., Richland, WA (United States). 7 Dec 1994. 27p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95004752. Source: OSTI; NTIS; INIS; GPO Dep.

A wind and seismic analysis was performed for the liquid-level gauge installation support stand. The analysis includes the stand and footing only. All of these supports are classified as safety class 3. The analysis was based on safety class 2 requirements for conservatism. Conventional hand calculations were performed to evaluate the stresses and overturning of the structure. The results and recommendations appear in Section 2.0. The configuration and loadings are discussed in Section 3.0; the analysis and evaluation appears in Section 4.0; and the detailed analysis is documented in Appendix A.

7396 (WHC-SD-WM-DA–159) **National standard and code compliance for electrical equipment installed in hazardous locations for the void fraction instrument.** Bussell, J.H.; Martin, J.D.; Stokes, T.I. Westinghouse Hanford Co., Richland, WA (United States). 26 Sep 1994. 19p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95002158. Source: OSTI; NTIS; INIS; GPO Dep.

The hazardous area classification is evaluated and defined for the void fraction instrument (VFI). The void fraction instrument is an instrument that is used to measure gas bubble concentration in tank waste. It is a 18.3 meter (60-foot) long pipe with swivel sampling head. The assembly is lowered into tank waste via an available riser and waste sample is obtained. The sample is obtained and the sample chamber is pressurized from a fixed volume chamber. The pressure is then measured and then the VFI is moved to the next sample elevation.

7397 (WHC-SD-WM-DP–073) **Tank 241-SY-103 auger samples, risers 7A, 14B and 22A.** Bell, K.E. Westinghouse Hanford Co., Richland, WA (United States). 12 Dec 1994. 208p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95005988. Source: OSTI; NTIS; INIS; GPO Dep.

Preliminary differential scanning calorimetry (DSC) and thermal gravimetric analysis (TGA) data were reported in a letter from K.L. Kocher, WHC, to G.D. Johnson; et. al, WHC, "40 Day Deliverable for Tank 241-SY-103", dated July 14, 1994. This report is the final report for the Sy-1-3 auger sample characterization effort; some of the data reported earlier may have changed. A copy of the hot cell work plan, chain of custody forms, extruded segment description sheets, and photographs of the extruded augers were also included in the cited letter. The final DSC, TGA, total organic carbon (TOC), and total inorganic carbon (TIC) data, and the DSC and TGA scans and analytical cards, are reported here.

7398 (WHC-SD-WM-DP–075) **Single Shell Tank Waste Characterization Project for Tank B-110, Core 9 - data package and PNL validation summary report.** Pool, K.N.; Jones, T.E.; McKinley, S.G.; Tingey, J.M.; Longaker, T.M.; Gibson, J.A. Westinghouse Hanford Co., Richland, WA (United States). 5 Dec 1990. 1506p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95005283. Source: OSTI; NTIS; INIS; GPO Dep.

This Data Package contains results obtained by Pacific Northwest Laboratory (PNL) staff in the characterization and analyses of Core 9 segments taken from the Single-Shell Tank (SST) 110B. The characterization and analysis of Core 9 segments are outlined in the Waste Characterization Plan for Hanford Site Single-Shell Tanks and in the Pacific Northwest Laboratory (PNL) Single-Shell Tank Waste Characterization Support FY 89/90 Statement of Work (SOW), Rev. 1 dated March, 1990. Specific analyses for each subsample taken from a segment are delineated in Test Instructions prepared by the PNL Single-Shell Tank Waste Characterization Project Management Office (SST Project) in accordance with procedures contained in the SST Waste Characterization Procedure Compendium (PNL-MA-599). Analytical procedures used in the characterization activities are also included in PNL-MA-599. Core 9 included five segments although segment 1 did not have sufficient material for characterization. The five samplers were received from Westinghouse Hanford Company (WHC) on 11/21-22/89. Each segment was contained in a sampler and was enclosed in a shipping cask. The shipping cask was butted up to the 325-A hot cell and the sampler moved into the hot cell. The material in the sampler (i.e., the segment) was extruded from the sampler, limited physical characteristics assessed, and photographed. At this point samples were taken for particle size and volatile organic analyses. Each segment was then homogenized. Sub-samples were taken for required analyses as delineated in the appropriate Test Instruction. Table 1 includes sample numbers assigned to Core 9 segment materials being transferred from 325-A Hot Cell. Sample numbers 90-0298, 90-0299, 90-0302, and 90-0303 were included in Table 1 although no analyses were requested for these samples. Table 2 lists Core 9 sub-sample numbers per sample preparation method.

7399 (WHC-SD-WM-ER–332) **Evaporation analysis for Tank SX-104.** Barrington, C.A. Westinghouse Hanford Co., Richland, WA (United States). Oct 1994. 21p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95004503. Source: OSTI; NTIS; INIS; GPO Dep.

Decreases in historical interstitial liquid level measurements in tank SX-104 were compared to predictions of a numerical model based upon diffusion of water through a porous crust. The analysis showed that observed level decreases could be explained by evaporation.

7400 (WHC-SD-WM-ER–349) **Historical Tank Content Estimate for the Northwest Quandrant of the Hanford 200 East Area.** Brevick, C.H.; Gaddis, L.A.; Pickett, W.W. Westinghouse Hanford Co., Richland, WA (United States). Jun 1994. 451p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95004789. Source: OSTI; NTIS; INIS; GPO Dep.

Historical Tank Content Estimate of the Northeast Quadrant provides historical evaluations on a tank by tank basis of the radioactive mixed wastes stored in the underground single-shell tanks of the Hanford 200 East area. This report summaries historical information such as waste history, temperature, tank integrity, inventory estimates and tank level history on a tank by tank basis. Tank Farm aerial photos and in-tank photos of each tank are provided. A brief description of instrumentation methods used for waste tank surveillance, along with the components of the data management effort, such as waste status and Transaction Record Summary, Tank Layering Model, Defined Waste Types, and Inventory Estimates to generate these tank content estimates are also given in this report.

7401 (WHC-SD-WM-ER–352) **Historical Tank Content Estimate for the Southwest Quandrant of the Hanford 200 West Area.** Brevick, C.H.; Gaddis, L.A.; Pickett, W.W. Westinghouse Hanford Co., Richland, WA (United States). Jun 1994. 319p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95004790. Source: OSTI; NTIS; INIS; GPO Dep.

Historical Tank Content Estimate of the Southwest Quadrant provides historical evaluations on a tank by tank basis of the radioactive mixed wastes stored in the underground single-shell tanks of the Hanford 200 West Area. This report summaries historical information such as waste history, temperature, tank integrity, inventory estimates and tank level history on a tank by tank basis. Tank farm aerial photos and in-tank photos of each tank are provided. A brief description of instrumentation and methods used for tank waste surveillance, along with the components of the data management effort, such as waste status and Transaction Record Summary, Tank Layering Model, Defined Waste Types, and Inventory Estimates to generate these tank content estimates are also given in this report.

7402 (WHC-SD-WM-ES–316) **Storage options for Long Length Contaminated Equipment (LLCE) items.** Hodgson, R.D. Westinghouse Hanford Co., Richland, WA (United States). Nov 1994. 21p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95005430. Source: OSTI; NTIS; INIS; GPO Dep.

A review of the Washington state requirements for the storage of long equipment items removed from tanks indicate that if the contaminated materials on the long equipment items are analyzed and determined to be DW, and not EHW, the containers can be stored on an uncovered, RCRA approved, storage pad. Long equipment items contaminated with reportable levels of EHW, or suspected of being contaminated with EHW, must be protected from the elements by means of a building or other protective covering that otherwise allows adequate inspection of the containers. Storage of the long equipment item containers on an uncovered storage pad is recommended and will reduce construction costs for new storage by an estimated 60 percent when compared to construction costs for enclosed storage.

7403 (WHC-SD-WM-FDC–032) **Tank SY-101 void fraction instrument functional design criteria.** McWethy, L.M. Westinghouse Hanford Co., Richland, WA (United States). 18 Oct 1994. 27p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95002159. Source: OSTI; NTIS; INIS; GPO Dep.

This document presents the functional design criteria for design, analysis, fabrication, testing, and installation of a void fraction instrument for Tank SY-101. This instrument will measure the void fraction in the waste in Tank SY-101 at various elevations.

7404 (WHC-SD-WM-OTP–167) **Caustic addition system operability test procedure.** Parazin, R.E. Westinghouse Hanford Co., Richland, WA (United States). Nov 1994. 32p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95004501. Source: OSTI; NTIS; INIS; GPO Dep.

This test procedure provides instructions for performing operational testing of the major components of the 241-AN-107 Caustic Addition System by WHC and Kaiser personnel at the Rotating Equipment Shop run-in pit (Bldg. 272E).

7405 (WHC-SD-WM-OTP–168) **Operability test procedure [Tank] 241-SY-101 equipment removal system.** Mast, J.C. Westinghouse Hanford Co., Richland, WA (United States). 8 Dec 1994. 107p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95004751. Source: OSTI; NTIS; INIS; GPO Dep.

The 241-SY-101 equipment removal system (ERS) consists of components, equipment, instrumentation and procedures that will provide the means to disconnect, retrieve, contain, load and transport the Mitigation Pump Assembly (MPA) from waste Tank 241-SY-101 to the Central Waste Complex (CWC). The Operability Test Procedure (OTP) will test the interfaces between ERS components and will rehearse the procedure for MPA removal and transportation to the extent they can be mocked-up at the CTF (Cold Test Facility). At the conclusion of the OTP, the ERS components and equipment will be removed from the CTF, entered into the Component Based Recall System (CBRS), and stored until needed for actual MPA removal and transportation.

7406 (WHC-SD-WM-OTP–171) **Operability test procedure for the TK-900 effluent monitoring station.** Weissenfels, R.D. Westinghouse Hanford Co., Richland, WA (United States). 21 Dec 1994. 27p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95005627. Source: OSTI; NTIS; INIS; GPO Dep.

This procedure will verify that the 221-B liquid effluent monitoring system, installed near the east end of the 6-in. chemical sewer header, functions as intended by design. TK-900B was installed near stairwell 3 in the 221-B electrical gallery by Project W-007H. The system is part of BAT/AKART for the BCE liquid effluent system.

7407 (WHC-SD-WM-SARR–012-Rev.1) **Accelerated safety analyses - structural analyses Phase I - structural sensitivity evaluation of single- and double-shell waste storage tanks.** Becker, D.L. Westinghouse Hanford Co., Richland, WA (United States). Nov 1994. 97p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95004755. Source: OSTI; NTIS; INIS; GPO Dep.

Accelerated Safety Analyses - Phase I (ASA-Phase I) have been conducted to assess the appropriateness of existing tank farm operational controls and/or limits as now stipulated in the Operational Safety Requirements (OSRs) and Operating Specification Documents, and to establish a technical basis for the waste tank operating safety envelope. Structural sensitivity analyses were performed to assess the response of the different waste tank configurations to variations in loading conditions, uncertainties in loading parameters, and uncertainties in material characteristics. Extensive documentation of the sensitivity analyses conducted and results obtained are provided in the detailed ASA-Phase I report, Structural Sensitivity Evaluation of Single- and Double-Shell Waste Tanks for Accelerated Safety Analysis - Phase I. This document provides a summary of the accelerated safety analyses sensitivity evaluations and the resulting findings.

7408 (WHC-SD-WM-SDR–008) **Purex canyon exhaust fan bearing temperature monitoring system doric 245 datalogger programming.** Blackaby, W.B. Westinghouse Hanford Co., Richland, WA (United States). 6 Sep 1994. 43p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95005469. Source: OSTI; NTIS; INIS; GPO Dep.

A micro-processor based datalogger is used to monitor, display, and log seventeen RTD temperature channels. Five bearings are monitored for each of the three electric motor-fan assemblies and two bearings are monitored on the steam turbine unit. Several alarms per data channel (a High alarm at 236 degrees and a High High alarm at 246 degrees F) will alert the operation's staff to increasing abnormal bearing temperatures. This procedure is cross-referenced to the manufacturers manual. All programming steps will have the following footnote: Mpg x-xx. The Mpg refers to the Manual page, with x as the section number and xx as the page number in that section. When more information is needed, such as pictures or details, then the manual section and page number is provided.

7409 (WHC-SD-WM-SOIL–001) **Soil weight (lbf/ft^3) at Hanford waste storage locations (2 volumes).** Pianka, E.W. Westinghouse Hanford Co., Richland, WA (United States). Dec 1994. 632p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95005299. Source: OSTI; NTIS; INIS; GPO Dep.

Hanford Reservation waste storage tanks are fabricated in accordance with approved construction specifications. After an underground tank has been constructed in the excavation prepared for it, soil is place around the tank and compacted by an approved compaction procedure. To ensure compliance with the construction specifications, measurements of the soil compaction are taken by QA inspectors using test methods based on American Society for the Testing and Materials (ASTM) standards. Soil compaction tests

data taken for the 241AP, 241AN, and 241AW tank farms constructed between 1978 and 1986 are included. The individual data values have been numerically processed to obtain average soil density values for each of these tank farms.

7410 (WHC-SD-WM-TA–154) **Strategy for sampling Hanford Site tank wastes for development of disposal technology.** Kupfer, M.J. Westinghouse Hanford Co., Richland, WA (United States). 29 Dec 1994. 44p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95005052. Source: OSTI; NTIS; INIS; GPO Dep.

This document explains the tank waste sampling strategy needed to obtain the information required to identify and develop pretreatment and waste immobilization processes. The key tenet of the strategy is that process testing with real waste material from the Hanford Site underground tanks is necessary to design processes and measure their effectiveness. This document provides the criteria for selection of the limited number of tanks to be sampled. A phased, iterative approach is used for the single-shell tank (SST) waste sampling. In the first sampling phase, samples are taken from 25 tanks which provide a good representation of the waste types of interest. Results from process testing of these samples will be considered in final selection of a limited number of additional SSTs to sample (currently expected to be an additional 14 tanks).

7411 (WHC-SD-WM-TA–156) **Tank Waste Remediation System tank waste pretreatment and vitrification process development testing requirements assessment.** Howden, G.F. Westinghouse Hanford Co., Richland, WA (United States). 24 Oct 1994. 210p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95004747. Source: OSTI; NTIS; INIS; GPO Dep.

A multi-faceted study was initiated in November 1993 to provide assurance that needed testing capabilities, facilities, and support infrastructure (sampling systems, casks, transportation systems, permits, etc.) would be available when needed for process and equipment development to support pretreatment and vitrification facility design and construction schedules. This first major report provides a snapshot of the known testing needs for pretreatment, low-level waste (LLW) and high-level waste (HLW) vitrification, and documents the results of a series of preliminary studies and workshops to define the issues needing resolution by cold or hot testing. Identified in this report are more than 140 Hanford Site tank waste pretreatment and LLW/HLW vitrification technology issues that can only be resolved by testing. The report also broadly characterizes the level of testing needed to resolve each issue. A second report will provide a strategy(ies) for ensuring timely test capability. Later reports will assess the capabilities of existing facilities to support needed testing and will recommend siting of the tests together with needed facility and infrastructure upgrades or additions.

7412 (WHC-SD-WM-TI–386) **Evaluation of AY/AZ tank farm ventilation system during aging waste retrieval operations.** Wong, J.J.; Waters, E.D. Westinghouse Hanford Co., Richland, WA (United States). [1995]. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95005077. Source: OSTI; NTIS; INIS; GPO Dep.

Waste Management is currently planning to demonstrate mobilization of radioactive waste sludges in Tank 101-AZ beginning in October 1991. The retrieval system being designed will utilize mixer pumps that generate high-velocity, high-volume submerged liquid jets to mobilize settled solids. There is concern that these jets may also generate radioactive aerosols, some of which may be carried into the tank Ventilation system. The purpose of this study is to determine if the current AY/AZ ventilation system or the proposed ventilation system upgrade (Project W-030) will provide adequate deentrainment of liquid and solid aerosols during mixer pump operations, or if the radioactive aerosols will overload the HEPA filters.

7413 (WHC-SD-WM-TI–608-Rev.1) **Hanford analytical sample projections FY 1995–FY 2000. Revision 1.** Simmons, F.M. Westinghouse Hanford Co., Richland, WA (United States). 2 Dec 1994. 62p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95004490. Source: OSTI; NTIS; INIS; GPO Dep.

Sample projections have been categorized into 7 major areas: Environmental Restoration, Tank Waste Remediation, Solid Waste, Liquid Effluents, Site Monitoring, Industrial Hygiene, and General Process Support Programs. The estimates are through the Fiscal Year 2000 and are categorized by radiation level. The yearly sample projection for each program will be categorized as follows: Category 1: Non-Radioactive; Category 2: <1 mR/hr β/γ; <10 nCi/g α; Category 3: 1 mR/hr β/γ to <10 mR/hr β/γ; and <10 nCi/g α; Category 4: <10 mR/hr β/γ; and <200 nCi/g α; Category 5: 10 mR/hr β/γ to <100 mR/hr β/γ; and <200 nCi/g α; Category 6: >100 mR/hr β/γ; and Category 7: >200 nCi/g α.

7414 (WHC-SD-WM-TI–666) **Sample Exchange Evaluation (SEE) Report - Phase II.** Winters, W.I. Westinghouse Hanford Co., Richland, WA (United States). 28 Sep 1994. 154p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95004502. Source: OSTI; NTIS; INIS; GPO Dep.

This report describes the results from Phase II of the Sample Exchange Evaluation (SEE) Program, a joint effort to compare analytical laboratory performance on samples from the Hanford Site's high-level waste tanks. In Phase II, the program has been expanded to include inorganic constituents in addition to radionuclides. Results from Phase II that exceeded 20% relative percent difference criteria are identified.

7415 (WHC-SD-WM-TP–163) **Liquid Effluent Monitoring Information System (LEMIS) test plans release 1.0.** Adams, R.T. Westinghouse Hanford Co., Richland, WA (United States). 12 Oct 1994. 540p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95002111. Source: OSTI; NTIS; INIS; GPO Dep.

The Liquid Effluent Monitoring Information System (LEMIS) is being developed as the organized information repository facility in support of the liquid effluent monitoring requirements of the Tri-Party Agreement. It is necessary to provide an automated repository into which the results from liquid effluent sampling will be placed. This repository must provide for effective retention, review, and retrieval of selected sample data by authorized persons and organizations. This System Architecture document is the aggregation of the DMR P+ methodology project management deliverables. Together they represent a description of the project and its plan through four Releases, corresponding to the definition and prioritization of requirements defined by the user.

7416 (WHC-SD-WM-TP–180) **Grout gas generation test plan.** Person, J.C. Westinghouse Hanford Co., Richland, WA (United States). 4 Jan 1995. 69p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95005623. Source: OSTI; NTIS; INIS; GPO Dep.

Disclosed are detailed procedures for measuring the rate of gas generation by grout made from synthetic tanks wastes or actual tank material. Objective is to measure the rate of gas generation for various gases (H_2, N_2O, etc.) produced when grout, prepared using tank waste, is heated at 65 C. Experiments will also be conducted using grout from synthetic tank waste, as practice. Purpose is to provide data for evaluation of safety risks presented by gas generation in the grout vault after making grout with tank waste, as verification/confirmation for gas generation rates for the ANL testing.

7417 (WHC-SD-WM-TP–206) **Tank 241-C-102 tank characterization plan.** Schreiber, R.D. Westinghouse Hanford Co., Richland, WA (United States). [1995]. 15p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95004977. Source: OSTI; NTIS; INIS; GPO Dep.

This document is a plan which serves as the contractual agreement between the Characterization Program, Sampling Operations, WHC 222-S Laboratory, and PNL 325 Analytical Chemistry Laboratory. The scope of this plan is to provide guidance for the sampling and analysis of samples from tank 241-C-102.

7418 (WHC-SD-WM-TP–219-Rev.1) **Engineering test plan for Tank 241-SY-101 In situ viscometer. Revision 1.** Stokes, T.I.; Pearce, K.L. Westinghouse Hanford Co., Richland, WA (United States). 12 Oct 1994. 33p. Sponsored by USDOE, Washington, DC

(United States). DOE Contract AC06-87RL10930. Order Number DE95002118. Source: OSTI; NTIS; INIS; GPO Dep.

To obtain in situ measurements of the rheological properties within tank 241-SY-101, this document will implement the test strategy defined in PNLMIT-041994, Acquisition and Reduction of Data Obtained in Tank SY-101 with the Ball Rheometer. Instructions for all sequences are defined within the procedure. All safety requirements as defined in LA-UR-92-3196, A Safety Assessment for Proposed Mixing Operations to Mitigate Episodic Gas Releases in Tank 241-101-SY have been implemented into this procedure.

7419 (WHC-SD-WM-TP–293) **Tank 241-TX-105 tank characterization plan.** Carpenter, B.C. Westinghouse Hanford Co., Richland, WA (United States). [1995]. 29p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95004978. Source: OSTI; NTIS; INIS; GPO Dep.

This document is a plan which serves as the contractual agreement between the Characterization Program, Sampling Operations, WHC 222-S Laboratory, Oak Ridge National Laboratory, and PNL tank vapor program. The scope of this plan is to provide guidance for the sampling and analysis of vapor samples from tank 241-TX-105.

7420 (WHC-SD-WM-TP–298) **241-BY-106 sampling test plan.** Bogen, G.J. Westinghouse Hanford Co., Richland, WA (United States). 18 Jan 1995. 16p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95005976. Source: OSTI; NTIS; INIS; GPO Dep.

This plan outlines the approach to be taken on obtaining the second core from 241-BY-106, riser 10B, using the Rotary Mode Core Sample Truck (RMCST). The purpose for obtaining the second core is to retrieve the final segments to determine ferrocyanide content. The first core acquired from riser 10B resulted in inadequate sample recovery for the labs to perform the required analysis. Thirteen samples were taken, with recovery varying from 0 to 100%. The most likely contributors to poor sample recovery have been identified and explained on a sample-by sample basis as outlined in this report. This information has been used to devise the approach to be taken in obtaining the second core.

7421 (WHC-SD-WM-TRP–229) **Test report – Prototype core sampler.** Linschooten, C.G. Westinghouse Hanford Co., Richland, WA (United States). 17 Jan 1995. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95005987. Source: OSTI; NTIS; INIS; GPO Dep.

The purpose of this test is to determine the adequacy of the prototype sampler, provided to Westinghouse Hanford Company (WHC) by DOE-RL. The sampler was fabricated for DOE-RL by the Concord Company by request of DOE-RL. This prototype sampler was introduced as a technology that can be easily deployed (similar to the current auger system) and will reliably collect representative samples. The sampler is similar to the Universal Sampler i.e., smooth core barrel and piston with an O-ring seal, but lacks a rotary valve near the throat of the sampler. This makes the sampler inappropriate for liquid sampling, but reduces the outside diameter of the sampler considerably, which should improve sample recovery. Recovery testing was performed with the supplied sampler in three different consistencies of Kaolin sludge simulants.

7422 (WHC-SD-WM-VI–014) **Evaluation of plasma melter technology for verification of high-sodium content low-level radioactive liquid wastes: Demonstration test No. 4 preliminary test report.** McLaughlin, D.F.; Gass, W.R.; Dighe, S.V.; D'Amico, N.; Swensrud, R.L.; Darr, M.F. Westinghouse Hanford Co., Richland, WA (United States). 10 Jan 1995. 52p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95005624. Source: OSTI; NTIS; INIS; GPO Dep.

This document provides a preliminary report of plasma arc vitrification testing by a vendor in support of the Hanford Tank Waste Remediation System Low-Level Waste (LLW) Vitrification Program. Phase I test conduct included 26 hours (24 hours steady state) of melting of simulated high-sodium low-level radioactive liquid waste. Average processing rate was 4.9 kg/min (peak rate 6.2 kg/min), producing 7330 kg glass product. Free-flowing glass pour point was 1250 C, and power input averaged 1530 kW(e), for a total energy consumption of 19,800 kJ/kg glass. Restart capability was demonstrated following a 40-min outage involving the scrubber liquor heat exchanger, and glass production was continued for another 2 hours. Some volatility losses were apparent, probably in the form of sodium borates. Roughly 275 samples were collected and forwarded for analysis. Sufficient process data were collected for heat/material balances. Recommendations for future work include lower boron contents and improved tuyere design/operation.

7423 (WHC-SD-WM-WP–218-Rev.1) **Work plan for upgrading the 241-A-701 compressed air system and motor control center. Revision 1.** Carpenter, K.E. Westinghouse Hanford Co., Richland, WA (United States). 17 Jan 1995. 16p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95005990. Source: OSTI; NTIS; INIS; GPO Dep.

This work plan will outline the responsibilities associated with the 241-A-701 Compressed Air System (CAS) and Motor Control Center (MCC) upgrades. All activities required to design, install, test, and operate the modified systems are addressed in this document. Upgrades Technical Support (UTS) of TWRS Engineering is responsible for the completion of all tasks associated with this upgrade. UTS will coordinate the upgrade activities, and ensure all tasks are successfully completed on or before the scheduled dates. The primary objective of the 241-A-701 Compressor and MCC Upgrade is to provide a reliable source of process and instrument compressed air to the A, AX, AY, and AZ tank farms.

7424 (WHC-SP–1108) **Quality assurance FY 1995 site support program plan WBS 6.7.2.5.** Dell, L.D. Westinghouse Hanford Co., Richland, WA (United States). Sep 1994. 78p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95004976. Source: OSTI; NTIS; INIS; GPO Dep.

This report is a summary of the quality assurance plan and program for the Westinghouse Hanford Company. The quality assurance plan verifies that the appropriate quality assurance programs and controls are applied to activities that affect quality related to work in: waste management; environmental activities (restoration, remediation, and monitoring); implementation of environmental, state, local, and federal regulations; tri-party agreement activities; facility operation and deactivation/transition to shutdown; new facility construction and operation.

7425 (WSRC-MS–94-0203P) **Characterization of high-level waste saltcake stored at the Savannah River Site.** Hobbs, D.T.; Coleman, C.J. Westinghouse Savannah River Co., Aiken, SC (United States). [1994]. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. (CONF-940813–35: 208. American Chemical Society national meeting, Washington, DC (United States), 21-26 Aug 1994). Order Number DE95005885. Source: OSTI; INIS; NTIS; GPO Dep.

Approximately 34 million gallons of high-level nuclear waste (HLW) are stored at the Savannah River Site (SRS) in 51 underground storage tanks. Facilities have been constructed to permanently dispose of this waste. The radioactive components will be separated from the bulk of the waste into a small volume fraction and vitrified in the Defense Waste Processing Facility (DWPF). The remaining, much larger volume fraction will be incorporated into a cement waste form in the Saltstone facility. Most of the radioactivity in the HLW is present in a solids fraction referred to as sludge. These solids are produced upon addition of sodium hydroxide to the acidic waste solutions to provide a highly alkaline slurry. The highly alkaline condition is necessary to prevent corrosion of the carbon steel storage tanks. After allowing the sludge solids to settle, the waste solutions are decanted and evaporated to conserve storage space in the tanks. Upon cooling, salts are crystallized from the evaporated wastes. The crystallized salts are referred to as saltcake.

7426 (WSRC-MS–94-0453) **Cadmium Control and Safety Rod Disposal at the Savannah River Site.** McInnis, S.H. Bechtel Savannah River, Inc., Aiken, SC (United States). 18 Jan 1995. 10p. Sponsored by USDOE, Washington, DC (United States). DOE

Contract AC09-89SR18035. (CONF-950216–6: Waste management '95, Tucson, AZ (United States), 26 Feb - 2 mar 1995). Order Number DE95060088. Source: OSTI; NTIS; INIS; GPO Dep.

A total of 862 activated cadmium control-safety rods will be removed from four heavy water moderated reactors at the Savannah River Site. The cadmium rods are mixed waste and must be disposed of in accordance with the Resource Conservation and Recovery Act . Determining a viable design plan for a 40-year-old facility while meeting today's standards, at a moderate cost, proved to be quite a challenge. First, a method to remove, handle and load these long, small-diameter cadmium rods from the reactor tank had to be determined. Second, a shielded cask that could fit in the small transfer pools and could hold the control rods, had to be located or designed. Third, the waste acceptance requirements, the RCRA requirements and the logistical difficulties in meeting these requirements had to be addressed. These difficulties were resolved through close interpretation of the RCRA laws, involved management, strong communication, and detailed engineering.

7427 (WSRC-MS–94-0600) **Deflagration-induced pressure and temperature transients in a waste storage facility.** Ades, M.J.; Polizzi, L.M. Westinghouse Savannah River Co., Aiken, SC (United States). [1995]. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. (CONF-950439–1: SMS simulation multiconference: simulation as a critical technology, Phoenix, AZ (United States), 9-13 Apr 1995). Order Number DE95004349. Source: OSTI; NTIS; INIS; GPO Dep.

This paper presents a study for a facility where a deflagration of flammable vapors takes place, and the generated pressure and temperature transients are analyzed to evaluate the pressure differentials induced on the various components of the facility to assesses their structural integrity. The temperature profiles are also analyzed to assess the qualification of the equipment that is required to operate during and after such an accident.

7428 (WSRC-MS–94-0608) **The stainless steel beneficial reuse integrated demonstration.** Boettinger, W.L.; Lutz, R.N. Westinghouse Savannah River Co., Aiken, SC (United States). [1994]. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. (CONF-950216–11: Waste management '95, Tucson, AZ (United States), 26 Feb - 2 mar 1995). Order Number DE95005888. Source: OSTI; NTIS; INIS; GPO Dep.

Process water heat exchangers at SRS contains over 95% 304 stainless steel which could be recycled back to DOE in a "controlled release" manner, that is, the radioactive scrap metal (RSM) could be reprocessed into new reusable products for return to DOE for use within the DOE Complex. In 1994, a demonstration was begun to recycle recycle contaminated stainless steel by melting 60 tons of RSM and refabricating it into containers for long-term temporary storage. The demonstration covers the entire recycle chain; the melting and the fabrication are to be done through subcontracts with private industry. Activity level of RSM to be supplied to industry is less than one curie total; the average specific activity level of the cobalt-60 which will be imbedded in the final products was estimated to be 117 pico curies per gram (4.31 becquerels/gram).

7429 (WSRC-MS–95-0012) **Vitrification Studies with DOE Low-Level Mixed Waste Wastewater Treatment Sludges.** Cicero, C.A. (Westinghouse Savannah River Co., Aiken, SC (United States)); Andrews, M.K.; Bickford, D.F.; Hewlett, K.J.; Bennert, D.M.; Overcamp, T.J. Westinghouse Savannah River Co., Aiken, SC (United States). 13 Jan 1995. 15p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. (CONF-950216–5: Waste management '95, Tucson, AZ (United States), 26 Feb - 2 mar 1995). Order Number DE95060083. Source: OSTI; NTIS; INIS; GPO Dep.

Vitrification studies with simulated Low Level Mixed Waste (LLMW) sludges were performed at the Savannah River Technology Center (SRTC). These studies focused on finding the optimum glass compositions for four simulated LLMW wastewater treatment sludges and were based on both crucible-scale and pilot-scale studies. Optimum compositions were determined based on the maximum waste loading achievable without sacrificing glass integrity.

7430 (WSRC-MS–95-0013) **Radiolytic Hydrogen Production During the Long Term Storage of Spent Organic Ion Exchange Resins.** Crawford, C.L.; Bibler, N.E. Westinghouse Savannah River Co., Aiken, SC (United States). 13 Jan 1995. 22p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. (CONF-950216–7: Waste management '95, Tucson, AZ (United States), 26 Feb - 2 mar 1995). Order Number DE95060084. Source: OSTI; NTIS; INIS; GPO Dep.

Organic ion exchange resins are used at Savannah River Site (SRS) and Hanford as well as many commercial nuclear installations to remove radionuclides from process waters that have become contaminated. Contamination of reactor moderator water can occur during reactor operation or the water in basins used to store spent fuel such as the K-basin at Hanford can become contaminated. After these resins have been used to the extent that they are no longer efficient for removing the radionuclides, the resins need to be stored and eventually placed in permanent disposal. During this storage, radiolysis from the radionuclides on the resin produces hydrogen and can create a flammable mixture in the storage container. Recent reviews stressing the importance of understanding the effects of radiation on resins used in the nuclear industry have been published. This report presents results of radiolysis studies designed to provide an estimate of the rate of hydrogen production from two commonly used resins so that the time to reach a flammable mixture (4 percent hydrogen in air) in the storage container can be estimated. We also include in this report further studies on our previously reported investigation of the radiolytic stability of a resorcinol-formaldehyde ion exchange resin. The resorcinol-formaldehyde polycondensation-type cation exchange resin is currently being investigated for potential cesium removal applications at Hanford and the Savannah River Site.

7431 (WSRC-MS–95-0025) **Experimental Chemical Milling Process to Decontaminate and Disposition Reactor Fuel at the Savannah River Site.** Davis, J.R.; Ross, R.H. Westinghouse Savannah River Co., Aiken, SC (United States). 13 Jan 1995. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. (CONF-950216–10: Waste management '95, Tucson, AZ (United States), 26 Feb - 2 mar 1995). Order Number DE95060086. Source: OSTI; NTIS; INIS; GPO Dep.

This paper presents the results of a scoping test to determine if a large scale chemical etching process would be effective at extraction of radionuclide and other hazardous contaminants from manufactured fuel tubes and assemblies. A review of the effectiveness of this process against other similar solid materials is considered. Because contaminants in contact with these types of materials tend to become electrostatically bonded to the substrate material, successful removal requires a chemical reaction to break these bonds. The process proposed is effective at bond deactivation and maintains an advantage over other decontamination alternatives due to its highly effective extraction of subsurface as well as surface contaminants. The large scale repeatability of the process makes it applicable to many areas of DOE decontamination and dismantlement activities complex wide.

7432 (WSRC-MS–95-0028) **Development of a Transportable Vitrification System for Mixed Waste.** Whitehouse, J.C. (Westinghouse Savannah River Co., Aiken, SC (United States)); Jantzen, C.M.; Bickford, D.F.; Kielpinski, A.L.; Helton, B.D.; Van Ryn, F. Westinghouse Savannah River Co., Aiken, SC (United States). 13 Jan 1995. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. (CONF-950216–9: Waste management '95, Tucson, AZ (United States), 26 Feb - 2 mar 1995). Order Number DE95060087. Source: OSTI; NTIS; INIS; GPO Dep.

The US DOE through the Mixed Waste Integrated Program, has identified a need to move mixed waste vitrification technology from the laboratory to the field as rapidly as possible. A great deal of work over the last few years has shown the feasibility of immobilizing selected hazardous waste streams in a vitrified product. Lab-scale work has been extended to pilot-scale tests, usually with surrogates of the actual waste. DOE felt that the technology was mature enough to allow demonstration in the field, on actual wastes, with units that would be prototypic of full sized waste

treatment equipment. To this end, DOE's Office of Technology Development sponsored the Westinghouse Savannah River Company (WSRC) to specify, procure, test, and operate a field scale demonstration using mobile equipment. Oak Ridge Reservation was chosen as the initial location for the field demonstration and Martin Marietta Reservation was chosen as the initial location for the field demonstration and Martin Marietta Energy Systems (MMES) tasked with all permitting, site preparation, and field support activities. During September 1993, WSRC used a "Vendor Forum" to solicit preliminary proposals for the Transportable Vitrification System (TVS). A number of quality proposals were received and evaluated. A vendor was selected and detailed negotiations were completed in August 1994, at which time a contract was signed for the TVS. In parallel, WSRC opened a dialogue with MMES to explore candidate waste streams at the Oak Ridge Reservation for the first TVS vitrification campaign. After some preliminary work, a group of waste water sludges were selected. The first of these to be demonstrated with the TVS will be the West End Treatment Facility (WETF) sludge. This paper describes the development of the specification for the TVS, the design and construction activities to date, and ongoing efforts for permitting and site support. The schedule for field application is also discussed.

7433 (WSRC-RP–94-1272) **Cesium cobaltdicarbollide-solubility, precipitation, and reactivity in basic aqueous solution.** McCabe, D.J.; Fanning, J.C.; Hugg, L.A.; Smith, W.A.; Terrell, A.S.; Yasinsac, L.; Todd, L.J.; Jasper, S.A. Jr. Westinghouse Savannah River Co., Aiken, SC (United States). [1994]. 20p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE95005881. Source: OSTI; NTIS; INIS; GPO Dep.

The title compound, $Cs^+[Co((3)\text{-}1,2\text{-}C_2B_9H_{11})_2]^-$(CsCDC), was precipitated with a NaCDC solution from solutions containing CsCl. The reaction was followed by measuring loss of light intensity as the precipitate formed. The $[Cs^+]$ and $[CDC^-]$ at the point of precipitation were estimated and approximate values of the K_{sp} for CsCDC determined at room temperature: 8×10^{-6} (water), 7×10^{-6} (1 M NaOH), and 2×10^{-6} (5M NaCl/0.1 M KOH/1.0 M NaOH). In some cases, NaCDC precipitated from solution when added to the latter salt solution. For the medium, 5 M $NaNO_3$/0.1 M KOH/1.0 M NaOH a four-fold excess of NaCDC was added to a 10mM Cs^+ solution at 40°C and the $[CDC^-]$ measured spectrophotometrically. Only CsCDC precipitated, and a K_{sp} of 3.9×10^{-6} was determined. The solubilities of CsCDC were measured in $NaNO_3$ and NaCl solutions at 30_C as a function of the Na salt concentration. Reaction of the CDC^- with OH^- slowly produces $B(OH_4^-$, H_2, and CoO(OH). Reaction of 22 μM CsCDC with 1M NaOH has a first order rate constant at 56°C of 8.8×10^{-7} s^{-1}, while that for 14 mM NaCDC is 7.2×10^{-7} s^{-1}. Activation energy for the reaction is 110 kJ.

7434 (WSRC-TR–94-0221) **Melter feed tank operating map from the FA-10.02 test data.** Spatz, T.L. Westinghouse Savannah River Co., Aiken, SC (United States). Aug 1994. 128p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE95005011. Source: OSTI; NTIS; INIS; GPO Dep.

The operability of the Melter Feed Tank (MFT) feed loops has been tested during the DWPF-FA-10.02 test. The ability to feed the melter at three distinct melter feed rates (0.20, 0.45, and 0.90 gpm), two distinct agitator speeds (65 and 130 rpm), varying liquid levels, and varying slurry rheologies was tested. This report correlates the operability of the feed loops with the above mentioned variables. The data are presented in the form of operating maps, Figs. 1 through 4, which are plots of the liquid level versus the wt% total solids (and yield stress) for two agitator speeds. The maps are divided into regions of acceptable feed loop operation and unacceptable feed loop operation. This report does not consider how closely the compositions of the MFT, the melter feed lines, and the Hydragard samples agree. The significant observations in this report are as follows: Both feed loops satisfy the operability criteria down to a liquid level below the upper impeller blade at low speed agitation (65 rpm). Under high speed agitation (130 rpm), feed loop No. 2 operates much more poorly than feed loop No. 1. The uncertainty associated with the wt% total solids of a slurry sample is larger than the current design basis range for total solids. The dilution of slurry due to pump priming is shown graphically in the chronological presentation of wt% total solids.

7435 (WSRC-TR–94-0311) **Sampling and analysis of soil from the old F-Area effluent ditch and its surrounding wetlands.** Dixon, K.L. Westinghouse Savannah River Co., Aiken, SC (United States). Jun 1994. 22p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE95005889. Source: OSTI; NTIS; INIS; GPO Dep.

Four surface soil samples were collected from the wetlands at the old F-Area effluent ditch. All samples were collected near shallow well point locations except FHB012, which was collected from the effluent ditch stream sediment. Samples were analyzed for metals, Target Compound List volatile organic compounds, and gross radiological indicators. Barium, beryllium, and zinc were detected in all four samples and antimony was detected in three of four samples. These metals occur naturally in the wetland soils at the SRS. Comparisons of metals concentrations were male to concentration ranges taken from background wetland soil samples. These comparison, showed that barium and beryllium concentrations were within expected ranges while zinc and antimony concentrations were elevated above expected concentration ranges. Volatile organic compounds were detected in all four samples. Detected compounds included acetone, 2-butanone, chloromethane, cis-1,2-dichloroethene, and toluene. The only radionuclide detected in a significant quantities was tritium which was detected in all four samples.

7436 (WSRC-TR–94-0326) **Analysis of glycerin waste in A-Area sanitary treatment facility material.** Westinghouse Savannah River Co., Aiken, SC (United States). [1995]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE95004802. Source: OSTI; NTIS; INIS; GPO Dep.

TNX has a large supply of 55 gallon drums containing pure glycerin and glycerin with additives. The glycerin drums were procured to simulate the glass stream in a pilot-scale melter process at TNX. Since the glycerin was not used for this process, TNX is looking at disposing the material in a sanitary waste treatment facility onsite. The effect of adding the contents of the drums to sewage bacteria was tested. A drum of pure glycerin and a drum of glycerin mixed with lithium chloride were tested. The test consisted of mixing sanitary sludge material with the glycerin material. The purpose of the test was to determine if the glycerin impacted the aerobic bacterial population. The bacterial densities were determined by taking samples from the sludge/glycerin mixtures and using aerobic plate count methods. The total organic carbon (TOC) levels were measured before and after testing. The results indicate that the cell density of the aerobic bacteria increased with the addition of glycerin and the glycerin mixture and the TOC removal rate was different for all tests. Disposal of glycerin in the wastewater treatment facilities should pose no problems. Additional testing and analysis of the mixed samples should be done before its disposal in a waste water treatment facility.

7437 (WSRC-TR–94-0437) **Mass transfer model for two-layer TBP oxidation reactions.** Laurinat, J.E. Westinghouse Savannah River Co., Aiken, SC (United States). 28 Sep 1994. 27p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE95004806. Source: OSTI; NTIS; INIS; GPO Dep.

To prove that two-layer, TBP-nitric acid mixtures can be safely stored in the canyon evaporators, it must be demonstrated that a runaway reaction between TBP and nitric acid will not occur. Previous bench-scale experiments showed that, at typical evaporator temperatures, this reaction is endothermic and therefore cannot run away, due to the loss of heat from evaporation of water in the organic layer. However, the reaction would be exothermic and could run away if the small amount of water in the organic layer evaporates before the nitric acid in this layer is consumed by the reaction. Provided that there is enough water in the aqueous layer, this would occur if the organic layer is sufficiently thick so that the rate of loss of water by evaporation exceeds the rate of replenishment due to mixing with the aqueous layer. This report presents measurements of mass transfer rates for the mixing of water and

butanol in two-layer, TBP-aqueous mixtures, where the top layer is primarily TBP and the bottom layer is comprised of water or aqueous salt solution. Mass transfer coefficients are derived for use in the modeling of two-layer TBP-nitric acid oxidation experiments. Three cases were investigated: (1) transfer of water into the TBP layer with sparging of both the aqueous and TBP layers, (2) transfer of water into the TBP layer with sparging of just the TBP layer, and (3) transfer of butanol into the aqueous layer with sparging of both layers. The TBP layer was comprised of 99% pure TBP (spiked with butanol for the butanol transfer experiments), and the aqueous layer was comprised of either water or an aluminum nitrate solution. The liquid layers were air sparged to simulate the mixing due to the evolution of gases generated by oxidation reactions. A plastic tube and a glass frit sparger were used to provide different size bubbles. Rates of mass transfer were measured using infrared spectrophotometers provided by SRTC/Analytical Development.

7438 (WSRC-TR–94-0462) **Evaluation of the effectiveness of the sealed double-ringed infiltrometers and the effects of changes in atmospheric pressure on hydraulic conductivity.** McMullin, S.R. Westinghouse Savannah River Co., Aiken, SC (United States). [1994]. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. (CONF-941124–9: 33. Hanford symposium on health and the environment: symposium on in-situ remediation–scientific basis for current and future technologies, Richland, WA (United States), 7-11 Nov 1994). Order Number DE95002695. Source: OSTI; NTIS; INIS; GPO Dep.

The Savannah River Site (SRS) is currently evaluating some 40 hazardous and radioactive-waste sites for remediation. A remedial alternative under consideration is the closing of a waste site with a RCRA-style closure cap. The closure cap is a moisture barrier designed to inhibit the free flow of water downward into the buried wastes. When a remedial design is prepared, it is often necessary to test the cap materials to verify compliance with this recommended limit. Among the EPA-recommended test instruments is the sealed double-ring infiltrometer (SDRI). During recent testing at the Savannah River Site (SRS), six SDRI were installed and tested on a single kaolin clay cap. The purpose of this testing was to obtain a measure of the distribution of hydraulic conductivity across a model kaolin clay cap. The test results provide an evaluation of instrument performance and a measure of the repeatability of results. In addition, the testing identified variations in the unsaturated hydraulic conductivity. This paper presents an overview of the SDRI, the testing program at SRS, and an evaluation of the observations and test results.

7439 (WSRC-TR–94-0509) **Development of Liquid Level and Density Bubbler for DWPF Canyon Vessels. Final report.** Duignan, M.R.; Barnes, A.B. Westinghouse Savannah River Co., Aiken, SC (United States). Oct 1994. 35p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE95060075. Source: OSTI; NTIS; GPO Dep.

Under Activity No. SRT-ETF-TT-94003-0 (approved March 31, 1994), which is the result of Technical Assistance Request 93-DWPT-PMC-A0002 (issued February 2, 1994), an experiment was performed to test several alternate liquid-level and density measuring bubbler tubes to replace the standard straight tube bubbler sensor used in DWPF canyon vessels and Holledge-type sensors, which are currently in use. This report describes an experiment that elicited positive results from two alternate bubbler tubes that incorporate all of the advantages of the fundamentally simple straight tube bubbler while trying to minimize plugging.

7440 (WSRC-TR–95-0014) **Upfront Delisting of F006 Mixed Waste.** Poulos, D.G.; Pickett, J.B.; Jantzen, C.M. Westinghouse Savannah River Co., Aiken, SC (United States). 13 Jan 1995. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. (CONF-950216–8: Waste management '95, Tucson, AZ (United States), 26 Feb - 2 mar 1995). Order Number DE95060085. Source: OSTI; NTIS; INIS; GPO Dep.

The US DOE at the Savannah River Site will petition the US EPA to upfront delist treatment residues generated from the vitrification of approximately 650,000 gallons of a regulated mixed (hazardous and radioactive) waste. The upfront petition, based on bench-scale treatability studies and pilot-scale system data, will exclude the vitrified wasteform from hazardous waste management regulations. The EPA encourages the use of the upfront delisting method as it allows applicants prior knowledge of waste specific treatment standards, which when met will render the waste non-hazardous, before generating the final wasteform. To meet the EPA performance based treatment standards, the waste must be stabilized to control the leaching of hazardous and radioactive constituents from the final wasteform. SRS has contracted a vendor to stabilize the mixed waste in a temporary Vitrification Treatment Facility (VTF). The EPA has declared vitrification as the Best Demonstrated Available Technology for high level radioactive wastes and the DOE Office of Technology Development has taken the position that mixed waste needs to be stabilized to the highest degree possible to ensure that the resulting wasteform meets both current and future regulatory specifications. Treatability studies conducted on a VTF pilot-scale system unit indicates that the mixed waste can be converted into a highly durable glass form, which exceeds the projected EPA performance based criteria. Upfront petitions can be processed by the EPA concurrently during facility construction or permitting activities; therefore, the SRS VTF will be capable of producing wastes which are considered non-hazardous sooner than otherwise expected. At the same time, EPA imposed conditional testing requirements to verify that the delisting levels are achieved by the fully operational VTF, ensures that only non-hazardous wastes are removed from hazardous waste management regulations. Vitrification of the (Abstract Truncated).

0530 Environmental Aspects

Refer also to citation(s) 7326, 7412, 7471, 7481, 7482, 8409, 8410, 8435, 8470, 8650

7441 (ANL/CMT/PP–82412) **Uranium-contaminated soils: Ultramicrotomy and electron beam analysis.** Buck, E.C.; Dietz, N.L.; Bates, J.K.; Cunnane, J.C. Argonne National Lab., IL (United States). Feb 1994. 15p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. Order Number DE95004644. Source: OSTI; NTIS; INIS; GPO Dep.

Uranium-contaminated soils from the U.S. Department of Energy (DOE) Fernald Site, Ohio, have been examined by a combination of scanning electron microscopy with backscattered electron imaging (SEM/BSE) and analytical electron microscopy (AEM). The inhomogeneous distribution of particulate uranium phases in the soil required the development of a method for using ultramicrotomy to prepare transmission electron microscopy (TEM) thin sections of the SEM mounts. A water-miscible resin was selected that allowed comparison between SEM and TEM images, permitting representative sampling of the soil. Uranium was found in iron oxides, silicates (soddyite), phosphates (autunites), and fluorite (UO_2). No uranium was detected in association with phyllosilicates in the soil.

7442 (DOE/AL/65030–9413) **Environmental report for Pantex Plant, 1993.** Mason and Hanger-Silas Mason Co., Inc., Amarillo, TX (United States). Jun 1994. 168p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-91AL65030. Order Number DE95006378. Source: OSTI; NTIS; INIS; GPO Dep.

This report presents summaries and interpretations of the environmental monitoring data collected during 1993 at Pantex Plant. Additionally, it outlines site environmental management performance, summarizes compliance with applicable environmental regulations, and describes significant programs and achievements. Environmental monitoring is composed of two principal collection and analysis activities for radiological and nonradiological constituents: (1) effluent monitoring involving liquid and airborne effluents to characterize and quantify releases and (2) environmental surveillance involving water, soil, vegetation, and biota and measurement of external radiation to characterize environmental impacts of Pantex Plant. Data are used to assess impacts of operations to the public and the environment and to demonstrate compliance with applicable standards for both radiological and nonradiological contaminants. In 1993 more than 270 onsite and offsite locations were monitored regularly with 4000 samples collected and analyzed. Data from a location at the US Department of Agriculture Bushland Agricultural Research Service and historical data are also presented for reference.

7443 (DOE/NV/10845–T20) **Area 5 Site characterization project report, FY 1994.** Albright, W.; Tyler, S.; Chapman, J.; Miller, M.; Estrella, R. USDOE Economic Regulatory Administration, Washington, DC (United States). Office of Utility Systems. Sep 1994. 20p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC08-90NV10845. Order Number DE95006254. Source: OSTI; NTIS; INIS; GPO Dep.

The Area 5 Site Characterization Project is designed to determine the suitability of the Radioactive Waste Management Site (RWMS) for disposal of low-level waste (LLW), mixed waste (MW) and transuranic waste (TRU). The Desert Research institute (DRI) has conducted this study for the Area 5 Site Characterization Project for the US Department of Energy, Nevada Operations Office (DOE/NV), Waste Management Division (WMD). The purpose of DRI's Area 5 Site Characterization Project is to characterize important properties of the upper vadose zone which influence infiltration and redistribution of water and transport of solutes as well as to characterize the water quality and hydrologic conditions of the uppermost aquifer. This report describes methods and presents a summary of all data and results from laboratory physical and chemical testing from borehole samples through September 1994. DRI laboratories performed soil water content, soil water potential, soil bulk density, and soil water extract isotope analyses.

7444 (DOE/RL–91-50-Rev.1) **Environmental Monitoring Plan, United States Department of Energy, Richland Operations Office. Revision 1.** Pacific Northwest Lab., Richland, WA (United States). 9 Nov 1994. 523p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. Order Number DE95006731. Source: OSTI; NTIS; INIS; GPO Dep.

This report describes environmental monitoring activities at Hanford Reservation. Attention is focused on effluent monitoring and environmental surveillance. All Hanford contractors reviewed potential sources of contamination. A facility effluent monitoring plan was written for each facility with the potential to release significant quantities of hazardous materials, addressing both radiological and nonradiological effluent monitoring. The environmental surveillance program assesses onsite and offsite environmental impacts and offsite human health exposures. The program monitors air, surface water, sediment, agricultural products, vegetation, soil, and wildlife. In addition, independent onsite surveillance is conducted to evaluate the effectiveness of Hanford Site effluent controls in order to comply with applicable environmental standards and regulations.

7445 (ES/ER/TM–123) **Airborne geophysical survey of the Oak Ridge Reservation, Tennessee.** Doll, W.E.; Nyquist, J.E.; Beard, L.P. Oak Ridge National Lab., TN (United States); Paducah Gaseous Diffusion Plant, KY (United States). Jul 1994. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400 ; AC05-76OR00001. Order Number DE95004744. Source: OSTI; NTIS; INIS; GPO Dep.

High-resolution and reconnaissance data, acquired using sensors mounted on a helicopter, were used to characterize waste sites and detect geologic properties that influence contaminant transport on the Oak Ridge Reservation (ORR), Tennessee, between December 1992 and April 1994. To date, these data have been used to support several ORR Environmental Restoration (ER) programs. This report summarizes the techniques used, the ways in which the data have been applied to date, and current plans for enhancing the data and making them more useful to the ER programs.

7446 (INIS-mf–14436) **The mining Pribram in science and technology. Section O: Mining and the environment.** Reichmann, F.; Novak, F. (eds.). No corporate text available. Oct 1993. 157p. (In Czech). (CONF-9310403–: The mining Pribram in science and technology, Pribram (Czech Republic), 13-16 Oct 1993). Order Number DE95612417. Source: OSTI; NTIS (US Sales Only); INIS.

The proceedings contain 18 contributions, out of which 10 have been inputted in INIS. These deal with remedial work in uranium mining regions, geological environmental problems in the surroundings of uranium deposits, radioactivity monitoring at uranium mining sites, provisions to reduce environmental impacts of mining, and changes in the ground water regime due to uranium mining. (J.B.).

7447 (INIS-mf–14436, pp. O12.1-O12.8) **Current effects of environmental provisions during uranium mining in the Ceska Lipa district.** Unzeitig, M. (Ministerstvo Zivotniho Prostredi, Prague (Czech Republic)). No corporate text available. Oct 1993. 157p. (In Czech). (CONF-9310403–: The mining Pribram in science and technology, Pribram (Czech Republic), 13-16 Oct 1993). In *The mining Pribram in science and technology. Section O: Mining and the environment.* Order Number DE95612417. Source: OSTI; NTIS (US Sales Only); INIS.

Over the entire period of hydrochemical extraction of uranium from the Straz pod Ralskem deposit (ie., since 1968), about 4 million tons of sulfuric acid, 170 thousand tons of nitric acid, 103 thousand tons of ammonia, and 25 thousand tons of hydrofluoric acid were pressed underground over an area of 28 km^2. This resulted in ground water pollution. The Czech Government therefore adopted provisions for remedial actions, consisting in pumping the leaching solutions and contaminated ground water up to the ground, and in their purification. Conditions are given for the treatment of the solutions within the proposed remedial conception. (J.B.). 4 refs.

7448 (INIS-mf–14436, pp. O18.1-O18.5) **Addressing the environmental burden remained after uranium surveying, mining and milling.** Kucera, M. (DIAMO s.p., Straz pod Ralskem (Czech Republic)); Kuehn, P. No corporate text available. Oct 1993. 157p. (In Czech). (CONF-9310403–: The mining Pribram in science and technology, Pribram (Czech Republic), 13-16 Oct 1993). In *The mining Pribram in science and technology. Section O: Mining and the environment.* Order Number DE95612417. Source: OSTI; NTIS (US Sales Only); INIS.

The environmental burden which remained after the surveying, mining and milling activities of the former Czechoslovak uranium industry is briefly characterized. The procedure of a systematic examination of all the affected sites is outlined. The problems of remedial actions are discussed; these include: setting up a complete inventory of the sites, evaluating their environmental impacts, assessing their risk, determining priorities in the remedial actions and setting up remedial project models, and funding of the actions. (J.B.).

7449 (INIS-mf–14436, pp. O6.1-O6.6) **Geological environmental problems in the surroundings of the Olsi uranium deposit.** Manour, J. (Cesky Geologicky Urad, Prague (Czech Republic)); Prochazka, J.; Slovak, J. No corporate text available. Oct 1993. 157p. (In Czech). (CONF-9310403–: The mining Pribram in science and technology, Pribram (Czech Republic), 13-16 Oct 1993). In *The mining Pribram in science and technology. Section O: Mining and the environment.* Order Number DE95612417. Source: OSTI; NTIS (US Sales Only); INIS.

Gamma radiation was measured, radon risk parameters were determined, the conditions of and changes in the surface and underground water chemism were evaluated, and the water deposit and soil pollution was examined in the surroundings of the Olsi uranium deposit. Gamma spectrometry revealed radioactivity of tailings due to uranium concentrations of 100 to 361 ppm. With respect to radon concentrations, the territory was divided into 3 risk sectors. In addition to volume activities of radon in air, the instantaneous volume activities in some buildings were also measured; the limiting value of 200 Bq/m^3 was found exceeded in 3 buildings. Surface water pollution was mostly below the permissible values, with few exceptions. High U, Mo, Ni and Be concentrations were found in the ground water. The sediment pollution corresponds to the natural situation before the mining. The soil pollution level is low. (J.B.). 7 figs., 9 refs.

7450 (INIS-mf–14436, [pp. O13.1-O13.26]) **Changes in the ground water regime in the Straz block due to uranium mining.** Fiedler, J. (DIAMO s.p., Straz pod Ralskem (Czech Republic)). No corporate text available. Oct 1993. 157p. (In Czech). (CONF-9310403–: The mining Pribram in science and technology, Pribram (Czech Republic), 13-16 Oct 1993). In *The mining Pribram in science and technology. Section O: Mining and the environment.* Order Number DE95612417. Source: OSTI; NTIS (US Sales Only); INIS.

The geology and hydrogeology are characterized of the Cenomanian and Turonian collectors in the uranium deposit region near the town of Straz pod Ralskem. The ground water regime was

changed by pumping off 760 m^3 and pressing in 470 m^3 of solutions (out of this, 450 and 150 m^3 of water, respectively). This brought about an overall change in the hydraulic situation. The uranium mining also led to significant changes in the chemical composition of ground water in the Cenomanian collector; the Turonian collector has also been affected to some extent. Anomalously high concentrations of contaminants in the investigated region brought about by changes in the ground water regime, pose a major risk. The basic principles of a system approach to rectifying this situation are explained. (J.B.). 1 tab., 7 figs., 7 refs.

7451 (ORNL/TM–12474) **Development of a three-dimensional groundwater flow model for Western Melton Valley: Application of P-FEM on a DOE waste site.** West, O.R.; Toran, L.E. Oak Ridge National Lab., TN (United States). Apr 1994. 39p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE95005974. Source: OSTI; NTIS; INIS; GPO Dep.

Environmental Sciences Division Publication Number 4268.

Modeling the movement of hazardous waste in groundwater was identified by the US Department of Energy (DOE) as one of the grand challenges in scientific computation. In recognition of this need, DOE has provided support for a group of scientists from several national laboratories and universities to conduct research and development in groundwater flow and contaminant transport modeling. This group is part of a larger consortium of researchers, collectively referred to as the Partnership in Computational Science (PICS), that has been charged with the task of applying high-performance computational tools and techniques to grand challenge areas identified by DOE. One of the goals of the PICS Groundwater Group is to develop a new three-dimensional groundwater flow and transport code that is optimized for massively parallel computers. An existing groundwater flow code, 3DFEMWATER, was parallelized in order to serve as a benchmark for these new models. The application of P-FEM, the parallelized version of 3DFEMWATER, to a real field site is the subject of this report.

7452 (PNL-SA–23775) **Direct measurements of transport properties are essential for site characterization.** Wright, J. (Pacific Northwest Lab., Richland, WA (United States)); Conca, J.L. Pacific Northwest Lab., Richland, WA (United States). Aug 1994. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-940815–105: International nuclear and hazardous waste management conference, Atlanta, GA (United States), 14-18 Aug 1994). Order Number DE95004940. Source: OSTI; NTIS; INIS; GPO Dep.

Direct measurements of transport parameters on subsurface sediments using, the UFA method provided detailed hydrostratigraphic mapping, and subsurface flux distributions at a mixed-waste disposal site at Hanford. Seven hundred unsaturated conductivity measurements on fifty samples were obtained in only six months total of UFA run time. These data are used to provide realistic information to conceptual models, predictive models and restoration strategies. The UFA instrument consists of an ultracentrifuge with a constant, ultralow flow pump that provides fluid to the sample surface through a rotating seal assembly and microdispersal system. Effluent from the sample is collected in a transparent, volumetrically-calibrated chamber at the bottom of the sample assembly. Using a strobe light, an observer can check the chamber while the sample is being centrifuged. Materials can be run in the UFA as recomposited samples or in situ samples can be subcored directly into the sample UFA chamber.

7453 (PNL-SA–24176) **Alpha spectral analysis via artificial neural networks.** Kangas, L.J. (Pacific Northwest Lab., Richland, WA (United States)); Hashem, S.; Keller, P.E.; Kouzes, R.T.; Troyer, G.L. Pacific Northwest Lab., Richland, WA (United States). Oct 1994. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-941061–13: Nuclear science symposium: medical imaging conference, Norfolk, VA (United States), 30 Oct - 5 nov 1994). Order Number DE95004567. Source: OSTI; NTIS; INIS; GPO Dep.

An artificial neural network system that assigns quality factors to alpha particle energy spectra is discussed. The alpha energy spectra are used to detect plutonium contamination in the work environment. The quality factors represent the levels of spectral degradation caused by miscalibration and foreign matter affecting the instruments. A set of spectra was labeled with a quality factor by an expert and used in training the artificial neural network expert system. The investigation shows that the expert knowledge of alpha spectra quality factors can be transferred to an ANN system.

7454 (USGS/OFR–94-303) **Water levels in wells J-11 and J-12, 1989-91, Yucca Mountain Area, Nevada.** Boucher, M.S. Geological Survey, Denver, CO (United States). 1994. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AI08-92NV10874. Order Number DE95004831. Source: OSTI; NTIS; INIS; U.S. Geological Survey, Earth Science Information Center, Open-File Reports Section, Box 25286, MS 517, Denver Federal Center, Denver, CO 80225; GPO Dep.

Water levels have been measured in the Yucca Mountain area, Nevada, since 1981 in order to gain a better understanding of the ground-water flow system in the area. Water levels in wells J-11 and J-12 have been periodically measured using calibrated reeled steel tapes since 1989, however, calculation of water-level altitude was not possible prior to 1993 due to missing reference elevations. These elevations were determined in 1993 by the U.S. Geological Survey. During 1989-91, water-level altitudes for well J-11 ranged from 732.09 to 732.40 meters and the mean water-level altitude was 732.19 meters. During 1989-91, water-level altitudes for well J-12 ranged from 727.84 to 728.03 meters, and the mean water-level altitude was 727.95 meters.

7455 (WHC-EP–0813) **Ground water impact assessment report for the 216-B-3 Pond system.** Johnson, V.G.; Law, A.G.; Reidel, S.P.; Evelo, S.D.; Barnett, D.B.; Sweeney, M.D. Westinghouse Hanford Co., Richland, WA (United States). Jan 1995. 94p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95005055. Source: OSTI; NTIS; INIS; GPO Dep.

Ground water impact assessments were required for a number of liquid effluent receiving sites according to the Hanford Federal Facility Agreement and Consent Order Milestones M-17-00A and M-17-00B, as agreed upon by the US Department of Energy. This report is one of the last three assessments required and addresses the impact of continued discharge of uncontaminated wastewater to the 216-B-3C expansion lobe of the B Pond system in the 200 East Area until June 1997. Evaluation of past and projected effluent volumes and composition, geohydrology of the receiving site, and contaminant plume distribution patterns, combined with ground water modeling, were used to assess both changes in ground water flow regime and contaminant-related impacts.

7456 (WHC-SD-EN-TI–241) **Geophysical investigation of 216-U-8 clay vitrified pipe transfer line, 200 West Area.** Bergstrom, K.A. Westinghouse Hanford Co., Richland, WA (United States). 5 Dec 1994. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95004508. Source: OSTI; NTIS; INIS; GPO Dep.

Two geophysical surveys were conducted over a vitrified clay pipeline (VCP) that was used to transfer liquid radioactive waste from the 224-U Building to the 216-U-8 and 216-U-12 cribs. The objectives of the surveys were to locate the VCP in the northern site, locate the bends in the VCP in the southern site, and locate possible utilities or pipelines at both sites. Ground-penetrating radar (GPR) was the method chosen for the surveys. Electromagnetic induction (EMI) was also used at the southern site to map the extent of a possible pipeline. It is very difficult to detect most VCPs with GPR, however, excavation boundaries for the pipeline are often discernible. The VCP was not identified in the GPR data at the northern site. Its anticipated depth was 10–12 ft. The VCP at the southern site appears to be much shallower. The data suggest it may be 5 ft or less below the surface in places. The edges of the excavation from N100 to N190 are between E120 and E135 and were quite distinct in the data. However, the excavation boundaries weren't apparent north of N190, suggesting that the VCP bends to the north near N200. Several profiles were extended beyond N200. These profiles detected a linear, with the characteristic signature of a pipeline, approximately 3 ft below the surface. There was no previous knowledge of the pipeline. The linear was traced across the entire surface contamination area with an EMI geophysical tool.

7457 (WHC-SD-W337-ATP–001) **Acceptance test procedure for the 340-NT-EX stack upgrades. Project W-337.** Hagerty, K.J. Westinghouse Hanford Co., Richland, WA (United States). 6 Dec 1994. 22p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95004754. Source: OSTI; NTIS; INIS; GPO Dep.

This document provides an Acceptance Test Procedure (ATP) for the project W-337 upgrades to the 340-NT-EX stack, and its associated sampling and monitoring systems.

7458 (WHC-SD-W337-OTP–001) **Operability test procedure for the 340-NT-EX stack upgrades – Project W337.** Hagerty, K.J. Westinghouse Hanford Co., Richland, WA (United States). 15 Dec 1994. 17p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95005284. Source: OSTI; NTIS; INIS; GPO Dep.

The purpose of the 340-NT-EX sampling system upgrade Operability Test Procedure (OTP) is to test and ensure the sampler system upgrades correctly interface with the control room alarm and recording functions. The sampling system monitors the exhaust air from a 300 Area waste handling facility for alpha, beta, gamma, particulate, and iodine releases.

7459 (WHC-SD-WM-TI–680) **291-B-1 stack monitoring and sampling system annual system assessment report.** Ridge, T.M. Westinghouse Hanford Co., Richland, WA (United States). 16 Dec 1994. 57p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95005051. Source: OSTI; NTIS; INIS; GPO Dep.

The B Plant 291-B-1 main stack exhausts gaseous effluents to the atmosphere from the 221-B Building canyon and cells, the No. 1 Vessel Ventilation System (VVS1), the 212-B Cask Station cell ventilation system, and, to a limited capacity, the 224-B Building. VVS1 collects offgases from various process tanks in 221-B Building, while the 224-B system maintains a negative pressure in out-of-service, sealed process tanks. B Plant Administration Manual, WHC-CM-7-5, Section 5.30 requires an annual system assessment to evaluate and report the present condition of the sampling and monitoring system associated with Stack 291-B-1 (System Number B977A) at B Plant. The system is functional and performing satisfactorily.

7460 (WSRC-RP–94-522) **Verification of the MAXIGASP and POPGASP Computer Codes for Environmental Dose Assessment.** Hamby, D.M. Westinghouse Savannah River Co., Aiken, SC (United States). 19 Jan 1995. 21p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE95060074. Source: OSTI; NTIS; GPO Dep.

MAXIGASP and POPGASP are environmental dosimetry codes that are based on the NRC dispersion module, XOQDOQ, and the NRC dosimetry module, GASPAR. XOQDOQ and GASPAR have been verified previously. The four remaining modules of MAXIGASP and POPGASP control input/output functions and data transfer. The results of MAXIGASP and POPGASP have been verified by comparison of hand calculated doses with program input.

7461 (WSRC-RP–94-584) **Thirty-Year Solid Waste Generation Forecast by Treatability Group.** Thomas, C. Westinghouse Savannah River Co., Aiken, SC (United States). Jul 1994. 55p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE95060080. Source: OSTI; NTIS; INIS; GPO Dep.

This report is Phase II of the Thirty-Year Solid Waste Generation Forecast for Facilities at SRS. Phase I of the forecast, Thirty-Year Solid Waste Generation Forecast for Facilities at SRS (Reference 4), forecasts the yearly quantities of LLW, hazardous, mixed, and TRU wastes generated over the next 30 years by operations, decontamination and decommissioning, and ER activities at SRS. The solid wastes stored or generated at SRS must be treated and disposed of in accordance with federal, state, and local laws and regulations. To evaluate, select, and justify the use of promising treatment technologies and to evaluate the potential impacts to the environment, the generic waste categories described in the Phase I report must be divided into smaller classifications with similar physical, chemical, and radiological characterisics. These classifications, defined as treatability groups, can be used in the WMEIS process to evaluate treatment options. The methodology used to categorize the SRS Solid Waste Streams into treatability groups is based on the premise that the key information ncessary for identifying like treatments can be discerned from the radiological, physical, and chemical properties of the wastes and their contaminants.

7462 (WSRC-RP–94-585) **Thirty-Year Solid Waste Generation Maximum and Minimum Forecast for SRS.** Thomas, L.C. Westinghouse Savannah River Co., Aiken, SC (United States). Oct 1994. 55p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE95060081. Source: OSTI; NTIS; INIS; GPO Dep.

This report is the third phase (Phase III) of the Thirty-Year Solid Waste Generation Forecast for Facilities at the Savannah River Site (SRS). Phase I of the forecast, Thirty-Year Solid Waste Generation Forecast for Facilities at SRS, forecasts the yearly quantities of low-level waste (LLW), hazardous waste, mixed waste, and transuranic (TRU) wastes generated over the next 30 years by operations, decontamination and decommissioning and environmental restoration (ER) activities at the Savannah River Site. The Phase II report, Thirty-Year Solid Waste Generation Forecast by Treatability Group (U), provides a 30-year forecast by waste treatability group for operations, decontamination and decommissioning, and ER activities. In addition, a 30-year forecast by waste stream has been provided for operations in Appendix A of the Phase II report. The solid wastes stored or generated at SRS must be treated and disposed of in accordance with federal, state, and local laws and regulations. To evaluate, select, and justify the use of promising treatment technologies and to evaluate the potential impact to the environment, the generic waste categories described in the Phase I report were divided into smaller classifications with similar physical, chemical, and radiological characteristics. These smaller classifications, defined within the Phase II report as treatability groups, can then be used in the Waste Management Environmental Impact Statement process to evaluate treatment options. The waste generation forecasts in the Phase II report includes existing waste inventories. Existing waste inventories, which include waste streams from continuing operations and stored wastes from discontinued operations, were not included in the Phase I report. Maximum and minimum forecasts serve as upper and lower boundaries for waste generation. This report provides the maximum and minimum forecast by waste treatability group for operation, decontamination and decommissioning, and ER activities.

7463 (WSRC-TR–94-0494) **Metallurgical Laboratory Hazardous Waste Management Facility groundwater monitoring report. Third quarter, 1994.** Westinghouse Savannah River Co., Aiken, SC (United States). Dec 1994. 383p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE95005971. Source: OSTI; NTIS; INIS; GPO Dep.

During third quarter 1994, samples from AMB groundwater monitoring wells at the Metallurgical Laboratory Hazardous Waste Management Facility (Met Lab HWMF) were analyzed for selected heavy metals, indicator parameters, radionuclides, volatile organic compounds, and other constituents. Eight parameters exceeded standards during the quarter. As in previous quarters, tetrachloroethylene and trichloroethylene exceeded final Primary Drinking Water Standards (PDWS). Bis(2-ethylhexyl) phthalate exceeded final PDWS in one well. Aluminum, iron, manganese, tin, and total organic halogens exceeded the Savannah River Site (SRS) Flag 2 criteria. Groundwater flow direction and rate in the M-Area Aquifer Zone were similar to previous quarters. Conditions affecting determination of groundwater flow directions and rates in the Upper Lost Lake Aquifer Zone, Lower Lost Lake Aquifer Zone, and the Middle Sand Aquifer Zone of the Crouch Branch Confining Unit were also similar to previous quarters. During second quarter 1994, SRS received South Carolina Department of Health and Environmental Control approval for constructing five point-of-compliance wells and two plume definition wells near the Met Lab HWMF. This project began in July 1994 and is complete; however, analytical data from these wells is not available yet.

7464 (WSRC-TR–94-0539) **Magnetic Survey of the Hydroflouric Acid Spill Area.** Cumbest, R.J. Westinghouse Savannah River Co., Aiken, SC (United States). 4 Nov 1994. 70p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE95060077. Source: OSTI; NTIS; GPO Dep.

A magnetic survey was conducted at the Hydroflouric Acid Spill Area to evaluate the possibility of buried metal containers or other ferric objects. A proton precession gradiometer with the bottom sensor 2 ft and the top sensor 4 ft from the ground surface was used to sample the survey area on a grid defined by 1 meter grid nodes in a square array. The survey area was surrounded on three sides by a metal fence and metal recycling facility. The fence and metal objects adjacent to the fence, in addition to metal associated with hydrologic monitoring well heads, waste unit marker balls and metal signs caused significant magnetic field and gradient anomalies that extended throughout most of the survey area. In addition to these easily explained anomalies, several anomalies were detected which probably result from buried ferric objects. Some of these anomalies are of limited aerial extent and magnitude and probably represent small shallow objects. However, at least one of the anomalies is of sufficient magnitude and extent that it may represent a large metal container such as a metal drum.

0540 Health and Safety

Refer also to citation(s) 7298, 7301, 7302, 7303, 7312, 7315, 7333, 7343, 7345, 7348, 7353, 7363, 7371, 7373, 7377, 7391, 7395, 7397, 7403, 7410, 7411, 7413, 7417, 7418, 7420, 7441, 7461, 7462, 7542, 7786, 7864, 7882, 8225, 8409, 8492, 8493

7465 (ANL/EA/CP–82216) **Insights on radiological risks of US Department of Energy radioactive waste management alternatives in the Environmental Management Programmatic Environmental Impact Statement.** Mueller, C. Argonne National Lab., IL (United States). [1994]. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-941142–29: American Society of Mechanical Engineers' winter annual meeting, Chicago, IL (United States), 9-11 Nov 1994). Order Number DE95005865. Source: OSTI; NTIS; INIS; GPO Dep.

A Facility Accident Analysis (1) was performed in support of the US Department of Energy (DOE) Environmental Management (EM) Programmatic Environmental Impact Statement (PEIS). It used an integrated risk-based approach (2) to allow risk comparisons of EM PEIS strategies for consolidating the storage and treatment of wastes at different DOE sites throughout the country. This approach was developed in accordance with the latest National Environmental Protection Act (NEPA) compliance guidance from DOE (3), which calls for consideration of a spectrum of accident scenarios that could occur in implementing the various actions evaluated in the EM PEIS. This paper discusses our insights with respect to the likely importance of the relative treatment technologies, waste management facilities and operations, and waste consolidation strategies considered in the EM PEIS.

7466 (ANL/EA/CP–84292) **Development of risk-based computer models for deriving criteria on residual radioactivity and recycling.** Chen, S.Y. (Argonne National Lab., IL (United States). Environmental Assessment Division). Argonne National Lab., IL (United States). [1994]. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9411165–1: 2. EPA/JAERI workshop, Tokai (Japan), 9-11 Nov 1994). Order Number DE95004650. Source: OSTI; NTIS; INIS; GPO Dep.

Argonne National Laboratory (ANL) is developing multimedia environmental pathway and health risk computer models to assess radiological risks to human health and to derive cleanup guidelines for environmental restoration, decommissioning, and recycling activities. These models are based on the existing RESRAD code, although each has a separate design and serves different objectives. Two such codes are RESRAD-BUILD and RESRAD-PROBABILISTIC. The RESRAD code was originally developed to implement the US Department of Energy's (DOE's) residual radioactive materials guidelines for contaminated soils. RESRAD has been successfully used by DOE and its contractors to assess health risks and develop cleanup criteria for several sites selected for cleanup or restoration programs. RESRAD-BUILD analyzes human health risks from radioactive releases during decommissioning or rehabilitation of contaminated buildings. Risks to workers are assessed for dismantling activities; risks to the public are assessed for occupancy. RESRAD-BUILD is based on a room compartmental model analyzing the effects on room air quality of contaminant emission and resuspension (as well as radon emanation), the external radiation pathway, and other exposure pathways. RESRAD-PROBABILISTIC, currently under development, is intended to perform uncertainty analysis for RESRAD by using the Monte Carlo approach based on the Latin-Hypercube sampling scheme. The codes being developed at ANL are tailored to meet a specific objective of human health risk assessment and require specific parameter definition and data gathering. The combined capabilities of these codes satisfy various risk assessment requirements in environmental restoration and remediation activities.

7467 (ANL/EAD/TM–33) **Derivation of uranium residual radioactive material guidelines for the 4400 Piehl Road Site, Ottawa Lake, Michigan.** Faillace, E.; Nimmagadda, M.; Yu, C. Argonne National Lab., IL (United States). Dec 1994. 20p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. Order Number DE95004186. Source: OSTI; NTIS; INIS; GPO Dep.

Residual radioactive material guidelines for uranium were derived for the 4400 Piehl Road site in Ottawa Lake, Michigan. This site has been designated for remedial action under the Formerly Utilized Sites Remedial Action Program (FUSRAP) of the US Department of Energy (DOE). Single nuclide and total uranium guidelines were derived on the basis of the requirement that the 50-year committed effective dose equivalent to a hypothetical individual who lives or works in the immediate vicinity of the 4400 Piehl Road site should not exceed 30 mrem/yr following remedial action for the current use and plausible future use scenarios. The DOE residual radioactive material guideline computer code, RESRAD, which applies the methodology described in the DOE manual for implementing residual radioactive material guidelines, was used in this evaluation.

7468 (ANL/EWM/CP–83384) **Decontamination and dismantlement of the Argonne National Laboratory-East Map Tube Facility.** Moos, L.P. (Argonne National Lab., IL (United States)); Wescott, J.B.; Fleming, D.L.; Subbaraman, G.; Horton, P. Argonne National Lab., IL (United States). [1994]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-941196–2: 2. ANS workshop on the safety of Soviet-designed nuclear power plants in conjunction with the winter meeting of the American Nuclear Society, Washington, DC (United States), 12-13 Nov 1994). Order Number DE95004652. Source: OSTI; NTIS; INIS; GPO Dep.

The Map Tube Facility at Argonne National Laboratory-East (ANL-E) was used to temporarily store small, highly radioactive objects and waste materials. The facility contained 129 cast-iron pipes set vertically in a 21 feet deep concrete monolithic structure. Deterioration of the unit allowed water to enter the pipes, carrying radioactive materials into surrounding soil and groundwater. Radioactive sediment and numerous small metallic objects were found in the pipes. Decontamination was undertaken to remove the radioactive water and sediment. The highly radioactive metallic objects were removed and characterized. Residual radioactivity was removed from the structure by removing each pipe from the concrete matrix through a deep concrete coring operation. Each 21 foot long pipe was removed from the concrete matrix as a single unit, lead in two joints in each pipe was removed and the cores were shipped to the DOE Hanford site for disposal. The coring operation successfully removed all residual radioactive material from the structure.

7469 (DOE/DP–0130) **Plutonium Finishing Plant safety evaluation report.** USDOE Assistant Secretary for Defense Programs, Washington, DC (United States). Jan 1995. 292p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95006855. Source: OSTI; NTIS; INIS; GPO Dep.

The Plutonium Finishing Plant (PFP) previously known as the Plutonium Process and Storage Facility, or Z-Plant, was built and put into operation in 1949. Since 1949 PFP has been used for various processing missions, including plutonium purification, oxide production, metal production, parts fabrication, plutonium recovery, and the recovery of americium (Am-241). The PFP has also been used for receipt and large scale storage of plutonium scrap and product materials. The PFP Final Safety Analysis Report (FSAR) was prepared by WHC to document the hazards associated with the facility, present safety analyses of potential accident scenarios, and demonstrate the adequacy of safety class structures, systems, and components (SSCs) and operational safety requirements (OSRs) necessary to eliminate, control, or mitigate the identified hazards. Documented in this Safety Evaluation Report (SER) is DOE's independent review and evaluation of the PFP FSAR and the basis for approval of the PFP FSAR. The evaluation is presented in a format that parallels the format of the PFP FSAR. As an aid to the reactor, a list of acronyms has been included at the beginning of this report. The DOE review concluded that the risks associated with conducting plutonium handling, processing, and storage operations within PFP facilities, as described in the PFP FSAR, are acceptable, since the accident safety analyses associated with these activities meet the WHC risk acceptance guidelines and DOE safety goals in SEN-35-91.

7470 (DOE-HDBK–1074-95) **Alternative systematic approaches to training.** USDOE, Washington, DC (United States). Jan 1995. 79p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95006851. Source: OSTI; NTIS; GPO Dep.

This handbook is approved for use by all DOE Components and contractors. The handbook was prepared primarily for DOE nuclear facilities, but the information can be effectively used by any other type of facility. DOE nuclear, DOE non-nuclear, commercial nuclear reactor, fuel fabrication, chemical processing, or other types of facilities may also apply the principles of this approach and find it useful and applicable to local needs. The handbook provides DOE and contractor operating organizations with concepts and guidance regarding the use of alternative techniques to implement a systematic approach to training (SAT). The techniques described in this handbook are endorsed by DOE and use of the guidance in this handbook is appropriate for establishment of technical training programs at DOE nuclear facilities. The use of guidance on selection and implementation of appropriate training approaches after consideration of job complexity, the consequences of error based on risk/hazard potential, and available training media should result in effective and efficient training programs. The information presented in this handbook can be used to grade the level of effort and formality used in developing training programs.

7471 (DOE/OR–01-1290-D1) **Third annual environmental restoration monitoring and assessment report for FY 1994 of the Oak Ridge National Laboratory, Oak Ridge, Tennessee.** Clapp, R.B.; Watts, J.A.; Guth, M.A.S. (eds.). Oak Ridge National Lab., TN (United States). Sep 1994. 201p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. (ORNL/ER–250). Order Number DE95004745. Source: OSTI; NTIS; INIS; GPO Dep.

ESD Publication 4301.

This report summarizes the salient features of the annual efforts of environmental monitoring, field investigations, and assessments conducted to support the Environmental Restoration (ER) Program at the Oak Ridge National Laboratory (ORNL). This report focuses on the watershed scale, providing an ORNL site-wide perspective on types, distribution, and transport of contamination. The results presented are used to enhance the conceptual understanding of the key contaminants and the sources, fluxes, and processes affecting their distribution and movement. This information forms a basis for prioritizing sites and for selecting, implementing, and evaluating remedial actions. This report summarizes the efforts of the Waste Area Grouping (WAG) 2 and Site Investigations (SI) Project. WAG 2 is the lower portion of the White Oak Creek system which drains the major contaminated sites at ORNL and discharges to the Clinch River where public access is allowed. The Remedial Investigation Plan (DOE 1992) for WAG 2 includes a long-term multimedia environmental monitoring effort that takes advantage of WAG 2's role as an integrator and the major conduit of contaminants from the ORNL site. During FY 1992, the remedial investigation activities were integrated with a series of environmental monitoring and SI activities at ORNL that address pathways and processes important for contaminant movement to gain a more integrated perspective of contamination movement at the watershed scale.

7472 (DOE/RL–94-46) **Environmental Restoration Program technology baseline plan.** Bechtel Hanford, Inc., Richland, WA (United States). Sep 1994. 50p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-93RL12367. Order Number DE95004949. Source: OSTI; NTIS; INIS; GPO Dep.

Plutonium production and purification processes at the Hanford Site generated and/or used numerous radioactive and hazardous substances, leaving behind a wide variety of hazardous, radioactive, and mixed wastes in the forms of contaminated soil, groundwater, buried waste, equipment, piping, and structures. Currently, there are at least 1,391 individual waste sites on the Hanford Site. Based on existing characterizations, 174 of the sites contain nonhazardous waste, 134 contain hazardous waste, 133 contain radioactive waste, and 950 contain mixed wastes. These sites are being remediated, decontaminated, and decommissioned by activities within the Hanford Site Environmental Restoration (ER) Program. This document presents a baseline for the many technologies anticipated to perform and support various types of remedial actions. It also discusses a variety of remediation strategies that, in combination, pose a number of technical, economic, and regulatory constraints that affect the selection of individual remediation technologies.

7473 (ES/ER/TM–33/R1) **Approach and strategy for performing ecological risk assessments for the U.S. Department of Energy's Oak Ridge Reservation: 1994 revision.** Suter, G.W. II; Sample, B.E.; Jones, D.S.; Ashwood, T.L. Oak Ridge National Lab., TN (United States). Aug 1994. 107p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE95004735. Source: OSTI; NTIS; INIS; GPO Dep.

This report provides guidance for planning and performing ecological risk assessments on the Oak Ridge Reservation (ORR). The tiered approach to ecological risk assessment has been implemented, generic conceptual models have been developed, and a general approach for developing ecological assessment endpoints and measurement endpoints has been agreed upon. The document also includes changes in terminology to agree with the terminology in the US Environmental Protection Agency's (EPA's) framework for ecological risk assessment. Although ecological risks are equal in regulatory importance to human health risks, formal procedures for ecological risk assessment are poorly developed. This report will provide specific guidance and promote the use of consistent approaches for ecological risk assessments at individual sites on the ORR. The strategy discussed in this report is consistent with the overall strategy for site management and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) compliance and with relevant EPA guidance. The general approach and strategy presented herein was developed for the ORR, but it should be applicable to other complex CERCLA sites that possess significant ecological resources.

7474 (ES/ER/TM–113) **Environmental Restoration Information Resource Management Program Plan.** Martin Marietta Energy Systems, Inc., Oak Ridge, TN (United States). Sep 1994. 69p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE95004739. Source: OSTI; NTIS; INIS; GPO Dep.

The Environmental Restoration Information Resources Management (ER IRM) Program Plan defines program requirements, organizational structures and responsibilities, and work breakdown structure and to establish an approved baseline against which overall progress of the program as well as the effectiveness of its management will be measured. This plan will guide ER IRM Program execution and define the program's essential elements. This plan will be routinely updated to incorporate key decisions and programmatic changes and will serve as the project baseline document. Environmental Restoration Waste Management Program

intersite procedures and work instructions will be developed to facilitate the implementation of this plan.

7475 (FEMP–2396) **Integrated planning: A baseline development perspective.** Clauss, L.; Chang, D. Fernald Environmental Restoration Management Corp., Cincinnati, OH (United States). 9 Dec 1994. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC24-92OR21972. (CONF-941246–6: 2. annual EM cost management conference, San Francisco, CA (United States), 5-9 Dec 1994). Order Number DE95004945. Source: OSTI; NTIS; INIS; GPO Dep.

The FEMP Baseline establishes the basis for integrating environmental activity technical requirements with their cost and schedule elements. The result is a path forward to successfully achieving the FERMCO mission. Specific to cost management, the FEMP Baseline has been incorporate into the FERMCO Project Control System (PCS) to provide a time-phased budget plan against which contractor performance is measured with an earned value management system. The result is the Performance Measurement Baseline (PMB), an important tool for keeping cost under control.

7476 (FEMP–95004724) **Draft final feasibility study report and proposed plan for Operable Unit 4, response to comments: Fernald Environmental Management Project, Fernald, Ohio.** USDOE Fernald Field Office, OH (United States). Feb 1994. 118p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95004724. Source: OSTI; NTIS; INIS; GPO; GPO Dep.

This report contains questions and comments regarding a risk evaluation and possible remedial action of Operable Unit 4 at the Feed Materials Production Center at Fernald, Ohio. Attention is focused on the US EPA Region V feasibility study and on the CRARE. The CRARE is a post-remediation time frame document.

7477 (LA–12857-ENV) **Environmental analysis of Lower Pueblo/Lower Los Alamos Canyon, Los Alamos, New Mexico.** Ferenbaugh, R.W.; Buhl, T.E.; Stoker, A.K.; Becker, N.M.; Rodgers, J.C.; Hansen, W.R. Los Alamos National Lab., NM (United States). Dec 1994. 117p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. Order Number DE95005744. Source: OSTI; NTIS; INIS; GPO Dep.

The radiological survey of the former radioactive waste treatment plant site (TA-45), Acid Canyon, Pueblo Canyon, and Los Alamos Canyon found residual contamination at the site itself and in the channel and banks of Acid, Pueblo, and lower Los Alamos Canyons all the way to the Rio Grande. The largest reservoir of residual radioactivity is in lower Pueblo Canyon, which is on DOE property. However, residual radioactivity does not exceed proposed cleanup criteria in either lower Pueblo or lower Los Alamos Canyons. The three alternatives proposed are (1) to take no action, (2) to construct a sediment trap in lower Pueblo Canyon to prevent further transport of residual radioactivity onto San Ildefonso Indian Pueblo land, and (3) to clean the residual radioactivity from the canyon system. Alternative 2, to cleanup the canyon system, is rejected as a viable alternative. Thousands of truckloads of sediment would have to be removed and disposed of, and this effort is unwarranted by the low levels of contamination present. Residual radioactivity levels, under either present conditions or projected future conditions, will not result in significant radiation doses to persons exposed. Modeling efforts show that future transport activity will not result in any residual radioactivity concentrations higher than those already existing. Thus, although construction of a sediment trap in lower Pueblo Canyon is a viable alternative, this effort also is unwarranted, and the no-action alternative is the preferred alternative.

7478 (LA–12863) **Distributions of 15 elements on 58 absorbers from simulated Hanford Double-Shell Slurry Feed (DSSF).** Marsh, S.F. (Sandia National Labs., Albuquerque, NM (United States)); Svitra, Z.V.; Bowen, S.M. Los Alamos National Lab., NM (United States). Nov 1994. 50p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. Order Number DE95005652. Source: OSTI; NTIS; INIS; GPO Dep.

As part of the Hanford Tank Waste Remediation System program at Los Alamos, we evaluated 58 commercially available or experimental absorber materials for their ability to remove hazardous components from high-level waste. These absorbers included cation and anion exchange resins, inorganic exchangers, composite absorbers, pillared layered materials, and a series of liquid extractants sorbed on porous support-beads. We tested these absorbers with a solution that simulates Hanford double-shell slurry feed (DSSF) (pH 14.0). To this simulant solution we added the appropriate radionuclides and used gamma spectrometry to measure fission products (Ce, Cs, Sr, Tc, and Y), actinides (U and Am), and matrix elements (Cr, Co, Fe, Mn, Ni, V, Zn, and Zr). For each of 870 element/absorber combinations, we measured distribution coefficients for dynamic contact periods of 30 min, 2 h, and 6 h to obtain information about sorption kinetics. On the basis of these 2610 measured distribution coefficients, we determined that many of the tested absorbers may be suitable for processing DSSF solutions.

7479 (LBL–36212) **The cascade of reservoirs of the "Mayak" Plant: Case history and the first version of a computer simulator.** Mironenko, M.V. (Russian Academy of Sciences, Moscow (Russian Federation). Vernadsky Inst. of Geochemistry and Analytical Chemistry); Spasennykh, M.Yu.; Polyakov, V.B. Lawrence Berkeley Lab., CA (United States). Jul 1994. 83p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00098. Order Number DE95006727. Source: OSTI; NTIS; INIS; GPO Dep.

The improvement of the ecological conditions at waste storing reservoirs is an important task of the restoration activity at Production Association (PA) "Mayak" (South Urals). The radionuclides mostly ^{90}Sr, ^{137}Cs, and chemical pollutants deposited in the reservoir water and in the bottom sediment are very dangerous sources for the contamination of Techa River below the reservoirs and the contamination of groundwater in the surrounding formations. The spreading of radioactive contaminants has both hydrogeological and the chemical features. The thermodynamic approach used to account for physical-chemical interactions between water and the bed rocks based on Gibbs free energy minimization of multicomponent system (H-O-Ca-Mg-K-Na-S-Cl-C-Sr) permitted the authors to calculate the corresponding ionic and complex species existing in the solutions, and to characterize the processes of precipitation and dissolution. The model takes into account the input and output surface and underground water fluxes, mass exchange of the reservoir with the atmosphere, radioactive decay and water-sediment interaction including processes of the ^{90}Sr and ^{137}Cs sorption on the grains of the sediment and the radionuclide diffusion in the pore water. This model was used in the retrospective and prognosis calculations of radiation and hydrochemical regime of these reservoirs.

7480 (LBL-PUB–3040-Rev.) **Level 1: Incidental crane operator's and incidental rigger's manual. Revision.** Neubauer, P. (ed.). Lawrence Berkeley Lab., CA (United States). Nov 1992. 47p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00098. Order Number DE95002358. Source: OSTI; NTIS; GPO Dep.

This document is a safety manual for incidental crane operators and incidental riggers. The information contained in this manual includes: Terminology and definitions, safety orientation, general operating procedures, high-consequence/high value lifts, sling safety, basic rules of hitching and rigging, and common errors in hitching.

7481 (ORNL/ER–169/S3) **WAG 2 remedial investigation and site investigation site-specific work plan/health and safety checklist for the sediment transport modeling task.** Holt, V.L.; Baron, L.A. Oak Ridge National Lab., TN (United States). May 1994. 36p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE95004733. Source: OSTI; NTIS; INIS; GPO Dep.

This site-specific Work Plan/Health and Safety Checklist (WP/HSC) is a supplement to the general health and safety plan (HASP) for Waste Area Grouping (WAG) 2 remedial investigation and site investigation (WAG 2 RI&SI) activities [Health and Safety Plan for the Remedial Investigation and Site Investigation of Waste Area Grouping 2 at the Oak Ridge National Laboratory, Oak Ridge, Tennessee (ORNL/ER-169)] and provides specific details and requirements for the WAG 2 RI&SI Sediment Transport Modeling Task. This WP/HSC identifies specific site operations, site hazards,

and any recommendations by Oak Ridge National Laboratory (ORNL) health and safety organizations [i.e., Industrial Hygiene (IH), Health Physics (HP), and/or Industrial Safety] that would contribute to the safe completion of the WAG 2 RI&SI. Together, the general HASP for the WAG 2 RI&SI (ORNL/ER-169) and the completed site-specific WP/HSC meet the health and safety planning requirements specified by 29 CFR 1910.120 and the ORNL Hazardous Waste Operations and Emergency Response (HAZWOPER) Program Manual. In addition to the health and safety information provided in the general HASP for the WAG 2 RI&SI, details concerning the site-specific task are elaborated in this site-specific WP/HSC, and both documents, as well as all pertinent procedures referenced therein, will be reviewed by all field personnel prior to beginning operations.

7482 (ORNL/ER–169/S4) **WAG 2 remedial investigation and site investigation site-specific work plan/health and safety checklist for the ecological assessment task, Kingfisher Study.** Holt, V.L.; Baron, L.A. Oak Ridge National Lab., TN (United States). May 1994. 41p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE95004731. Source: OSTI; NTIS; INIS; GPO Dep.

This report provides specific details and requirements for the WAG 2 remedial investigation and site investigation Ecological Assessment Task, Kingfisher Study, including information that will contribute to safe completion of the project. The report includes historical background; a site map; project organization; task descriptions and hazard evaluations; controls; and monitoring, personal protective equipment, decontamination, and medical surveillance program requirements. The report also includes descriptions of site personnel and their certifications as well as suspected WAG 2 contaminants and their characteristics. The primary objective of the WAG 2 Kingfisher Study is to assess the feasibility of using kingfishers as biological monitors of contaminants on the Oak Ridge Reservation (ORR). Kingfisher sample collection will be used to determine the levels of contaminants and degree of bioaccumulation within a common piscivorous bird feeding on contaminated fish from streams on the ORR.

7483 (ORNL/ER–264) **Data summary for the near-shore sediment characterization task of the Clinch River Environmental Restoration Program.** Levine, D.A.; Hargrove, W.W.; Campbell, K.R.; Wood, M.A.; Rash, C.D. Oak Ridge National Lab., TN (United States). Oct 1994. 86p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE95004730. Source: OSTI; NTIS; INIS; GPO Dep.

This report presents the results of the Near-Shore Sediment Characterization Task of the Clinch River Environmental Restoration Program (CR-ERP). The goals of the task were to (1) determine the extent to which near-shore surface sediments are contaminated by releases from the Oak Ridge Reservation (ORR) and (2) provide data for the Watts Bar Reservoir Interagency Permitting Group (WBRIPG) to evaluate the human health risks from exposure to sediments during and following dredging operations. The data collected for this task are also to be used in the Remedial Investigation/Feasibility Study (RI/FS) for the CR-ERP operable units (Lower Watts Bar and Clinch River) to characterize the human health risk associated with exposure to near-shore sediments throughout the Watts Bar Reservoir.

7484 (ORNL/ER–286) **Technology study of Gunite tank sludge mobilization at Oak Ridge National Laboratory, Oak Ridge, Tennessee.** DeVore, J.R.; Herrick, T.J.; Lott, K.E. Oak Ridge National Lab., TN (United States). Dec 1994. 132p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE95005736. Source: OSTI; NTIS; INIS; GPO Dep.

The Oak Ridge National Laboratory (ORNL) Gunite Tank Sludge Mobilization Technology Study was initiated to support the Gunite Tank Treatability Study effort. The technology study surveyed the methods and technologies available for tank cleaning and sludge mobilization in a radioactive environment. Technologies were identified and considered for applicability to the Gunite and Associated Tanks (GAAT) problems. These were then either accepted for further study or rejected as not applicable. Technologies deemed applicable to the GAAT sludge removal project were grouped for evaluation according to (1) deployment method, (2) types of remotely operated end effector equipment applicable to removal of sludge, (3) methods for removing wastes from the tanks, and (4) methods for concrete removal. There were three major groups of deployment technologies: "past practice" technologies, mechanical arm-based technologies, and vehicle-based technologies. The different technologies were then combined into logical sequences of deployment platform, problem, end effector, conveyance, post-removal treatment required (if any), and disposition of the waste. Many waste removal options are available, but the best technology in one set of circumstances at one site might not be the best type to use at a different site. No single technology is capable of treating the entire spectrum of wastes that will be encountered in GAAT. None of the systems used in other industries appears to be suitable, primarily because of the nature of the sludges in the GAAT Operable Unit (OU), their radiation levels, and tank geometries. Other commercial technologies were investigated but rejected because the authors did not believe them to be applicable.

7485 (ORNL/GWPO–012) **Tritium tracer movement as an analogy for pump and treat remediation.** Oak Ridge National Lab., TN (United States). Dec 1994. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. (ORNL/M–4039). Order Number DE95005992. Source: OSTI; NTIS; INIS; GPO Dep.

Environmental Sciences Division Publication Number 4370.

There has been debate over effectiveness of groundwater pump and treat remediation. The goal of the following discussion is to present evidence from a tracer test that illustrates the difficulty in removing contaminants from fractured shale that is typical of portions of the DOE-Oak Ridge Reservation (ORR). This report provides a brief prelude to more detailed analysis that is in progress. Attempts to remediate groundwater contamination with pump and treat technology have been hampered by difficulties in removing contaminants in slow flow zones. There is interest in using this remediation method on the ORR because it is an existing technology. However, this setting provides a rather extreme contrast between fast flow zones (fractures) and slow flow zones (the matrix surrounding the fractures). Over the past few years, the authors have begun to develop an understanding of how contaminants move in fractures and how contaminant exchange between the fracture and matrix occurs. In particular, they have evidence from a long term tritium tracer test that has direct bearing on potential success or failure of pump and treat remediation in fractured rocks.

7486 (PNL–10184) **Six-phase soil heating for enhanced removal of contaminants: Volatile organic compounds in non-arid soils integrated demonstration, Savannah River Site.** Gauglitz, P.A. (and others); Bergsman, T.M.; Caley, S.M. Pacific Northwest Lab., Richland, WA (United States). Oct 1994. 66p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. Order Number DE95002856. Source: OSTI; NTIS; INIS; GPO Dep.

In November 1993, Pacific Northwest Laboratory (PNL) and Savannah River Site (SRS) personnel conducted a demonstration of six-phase soil heating (SPSH) at the Savannah River Site (SRS) in Aiken, South Carolina. The demonstration was part of the Volatile Organic Compounds in Non-Arid Soils Integrated Demonstration being conducted near the M-Area operations at the SRS, along a corridor that once contained a process sewer leading to the M-Area seepage basin. In the early 1980s, this sewer line was discovered to be leaking process wastes into the subsurface and contributing to groundwater contamination in the vicinity of M-Area seepage basin. Although use of the sewer line has been discontinued, the slow release of chlorinated solvents such as trichloroethylene (TCE) and perchloroethylene (PCE) from the heterogeneous vadose zone soil continues to be a source of potential groundwater contamination. A significant portion of the VOCs at the demonstration site are retained in low-permeability clay zones. Previous studies have shown that the rate of conventional SVE remediation of the SRS clays is quite slow. The permeability of the clay is of order 10^{-12} cm^2, which makes this a particularly difficult interval to remediate. Thus, the challenge for SPSH is to effectively remediate this clay zone by accelerating the removal of TCE and PCE.

7487 (PNL-SA-23839) **The Environmental and Molecular Sciences Laboratory project – Continuous evolution in leadership.** Knutson, D.E.; McClusky, J.K. Pacific Northwest Lab., Richland, WA (United States). Oct 1994. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-941091–3: 25. Project Management Institute annual seminar and symposium, Vancouver (Canada), 17-19 Oct 1994). Order Number DE95004572. Source: OSTI; NTIS; INIS; GPO Dep.

The Environmental and Molecular Sciences Laboratory (EMSL) construction project at Pacific Northwest Laboratory (PNL) in Richland, Washington, is a $230M Major Systems Acquisition for the US Department of Energy (DOE). The completed laboratory will be a national user facility that provides unparalleled capabilities for scientists involved in environmental molecular science research. This project, approved for construction by the Secretary of Energy in October 1993, is underway. The United States is embarking on an environmental cleanup effort that dwarfs previous scientific enterprise. Using current best available technology, the projected costs of cleaning up the tens of thousands of toxic waste sites, including DOE sites, is estimated to exceed one trillion dollars. The present state of scientific knowledge regarding the effects of exogenous chemicals on human biology is very limited. Long term environmental research at the molecular level is needed to resolve the concerns, and form the building blocks for a structure of cost effective process improvement and regulatory reform.

7488 (SAND–94-1718C) **In situ electrokinetic control of moisture and nutrients in unsaturated soils.** Lindgren, E.R.; Brady, P.V. Sandia National Labs., Albuquerque, NM (United States). [1994]. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. (CONF-950483–1: 3. international symposium on in situ and on-site bioreclamation, San Diego, CA (United States), 24-27 Apr 1995). Order Number DE95004527. Source: OSTI; NTIS; GPO Dep.

Many DOE facilities have unsaturated soils contaminated with metals and organic solvents. Because of the large volumes, in situ remediation is often the most economically attractive remediation technique. The success of many in situ treatment technologies depends critically on the degree to which the movement of water and desired ions can be engineered in the vadose zone. Bioremediation efforts in the vadose zone are limited by the ability to provide moisture and nutrients to contaminant-metabolizing microorganisms. An in situ electrokinetic remediation process has been developed at Sandia National Laboratories (SNL) for use in unsaturated soils, and is presently undergoing field demonstration. The electrokinetic process is not limited by low soil permeabilities and, therefore, provides a level of control not achievable by hydraulic means. Moisture is added to the subsurface in a controlled fashion such that the field capacity is never exceeded, preventing the unwanted mobilization of dissolved contaminants by saturated wetting fronts. The Sandia electrokinetic process can potentially transport both water and nutrients for bioremediation efforts and is compatible with vapor phase in situ techniques such as bioventing. The approach should as bioventing. The approach should lend itself to the directed transport of biodegradable chelating agents and complexed metals from contaminated soils.

7489 (WHC-EP–0532-Rev.2) **High-heat tank safety issue resolution program plan. Revision 2.** Wang, O.S. Westinghouse Hanford Co., Richland, WA (United States). Dec 1994. 55p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95005054. Source: OSTI; NTIS; INIS; GPO Dep.

The purpose of this program plan is to provide a guide for selecting corrective actions that will mitigate and/or remediate the high-heat waste tank safety issue for single-shell tank 241-C-106. The heat source of approximately 110,000 Btu/hr is the radioactive decay of the stored waste material (primarily ^{90}Sr) inadvertently transferred into the tank in the later 1960s. Currently, forced ventilation, with added water to promote thermal conductivity and evaporation cooling, is used for heat removal. The method is very effective and economical. At this time, the only viable solution identified to permanently resolve this safety issue is the removal of heat-generating waste in the tank. This solution is being aggressively pursued as the only remediation method to this safety issue, and tank 241-C-106 has been selected as the first single-shell tank for retrieval. The current cooling method and other alternatives are addressed in this program as means to mitigate this safety issue before retrieval. This program plan has three parts. The first part establishes program objectives and defines safety issue, drivers, and resolution criteria and strategy. The second part evaluates the high-heat safety issue and its mitigation and remediation methods and other alternatives according to resolution logic. The third part identifies major tasks and alternatives for mitigation and resolution of the safety issue. A table of best-estimate schedules for the key tasks is also included in this program plan.

7490 (WHC-EP–0797) **Cone penetrometer testing at the Hanford Site: Final performance evaluation report.** Richterich, L.R.; Cassem, B.R. Westinghouse Hanford Co., Richland, WA (United States). Aug 1994. 62p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95002469. Source: OSTI; NTIS; INIS; GPO Dep.

The Volatile Organic Compounds-Arid Integrated Demonstration (VOC-Arid ID) is one of several US Department of Energy (DOE) integrated demonstrations designed to support the testing of emerging environmental characterization and remediation technologies in support of the Environmental Restoration (ER) and Waste Management (WM) Programs. The primary objective of the VOC Arid ID at the Hanford Site is to characterize, remediate, and monitor arid and semi-arid sites containing volatile organic compounds with or without associated contamination. The main objective of the Arid Drilling Technology Technical Task Plan is to demonstrate promising subsurface access technologies; this includes using the cone penetrometer (CPT) system for source detection, characterization, monitoring, and remediation in support of environmental activities. The utility of the CPT for performing site characterization work has been the subject of much discussion and speculation at the Hanford Site and other arid sites because of the preponderance of thick units of coarse cobbles and gravel in the subsurface.

7491 (WHC-SA–2731) **Virtual reality and stereoscopic telepresence.** Mertens, E.P. Westinghouse Hanford Co., Richland, WA (United States). Dec 1994. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. (CONF-941249–1: Savings through sharing conference, Washington, DC (United States), 7 Dec 1994). Order Number DE95004787. Source: OSTI; NTIS; INIS; GPO Dep.

Virtual reality technology is commonly thought to have few, if any, applications beyond the national research laboratories, the aerospace industry, and the entertainment world. A team at Westinghouse Hanford Company (WHC) is developing applications for virtual reality technology that make it a practical, viable, portable, and cost-effective business and training tool. The technology transfer is particularly applicable to the waste management industry and has become a tool that can serve the entire work force spectrum, from industrial sites to business offices. For three and a half years, a small team of WHC personnel has been developing an effective and practical method of bringing virtual reality technology to the job site. The applications are practical, the results are repeatable, and the equipment costs are within the range of present-day office machines. That combination can evolve into a competitive advantage for commercial business interests. The WHC team has contained system costs by using commercially available equipment and personal computers to create effective virtual reality work stations for less than $20,000.

7492 (WHC-SD-CP-RPT–012-Rev.1) **Report of clean out and flushing of UO_3 Plant processing equipment: Revision 1.** Gonsalves, E. Westinghouse Hanford Co., Richland, WA (United States). 2 Dec 1994. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95004487. Source: OSTI; NTIS; INIS; GPO Dep.

The UO_3 Plant went through a clean out leading to the deactivation of the facility. This clean out consisted of three phases. Phase 1 consisted of the removal of residual process material and the deactivation of most process equipment and instrumentation. Phase 2 consisted of the fixing or removal of contamination so storm water processing would be no longer required. Phase 3 consisted of the remaining activities that had to be completed before the facility was turned over to the Surplus Facility Program. Since the activities of

Phase 2 and 3 were closely related, these two phases were worked simultaneously. The first part of this document summarizes the Phase 1 clean out procedures and their results. Phase 1 was completed on February 28, 1994. The second part summarizes the Phase 2/3 clean out procedures and their results. Phase 2/3 was completed before December 31, 1994. Because tanks and equipment were flushed simultaneously or in a specific sequence, the clean out processes are discussed per workplan.

7493 (WHC-SD-EN-PRS–002) **Summary report of Hanford Site well remediation and decommissioning activities for fiscal year 1994.** Reynolds, K.D. Westinghouse Hanford Co., Richland, WA (United States). 30 Dec 1994. 42p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95005629. Source: OSTI; NTIS; INIS; GPO Dep.

Remediation and decommissioning of Hanford Site wells has become an integral part of Hanford Site Environmental Restoration (ER) and Resource Conservation and Recovery Act of 1976 (RCRA) groundwater monitoring programs. A well remediation and decommissioning program was funded and implemented in fiscal year (FY) 1993 under the RCRA and Operational Monitoring (ROM) Program. Funding for this work increased in FY 1994. In FY 1994 well decommissioning activities conducted for the ROM program were centered around the 200 West Area; activities for the ER program were centered in the Fitzner/Eberhart Arid Land Ecology (ALE) (Reserve) unit and the Wahluke Slope (North Slope) area. A total of 116 wells and test borings were decommissioned between the two programs during FY 1994. Additionally, five wells were identified as in need of remediation and were successfully brought into compliance with regulatory requirements. As Hanford Site restoration and remediation efforts increase in scope, the well decommissioning program will remain dynamic. The program will aggressively seek to fulfill the needs of the various environmental cleanup and groundwater/vadose monitoring programs. Wells that do not meet regulatory requirements for preservation will continually be identified and remediated or decommissioned accordingly.

7494 (WHC-SD-GN-TRP–20026) **Load test of the 277W Building high bay roof deck and support structure.** McCoy, R.M. Westinghouse Hanford Co., Richland, WA (United States). 2 Dec 1994. 24p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95004492. Source: OSTI; NTIS; INIS; GPO Dep.

The 277W Building high bay roof area was load tested according to the approved load-test procedure, WHC-SD-GN-TP-30015, Revision 1. The 277W Building is located in the 200 West Area of the Hanford Site and has the following characteristics: roof deck – wood decking supported by 4 x 14 timber purlins; roof membrane – tar and gravel; roof slope – flat (<10 deg); and roof elevation – maximum height of about 63 ft. The 227W Building was visited in March 1994 for a visual inspection. During this inspection, cracked areas were visible in the decking, but it was not possible to determine whether these cracks extended completely through the decking, which is 2-in. thick. The building was revisited in March 1994 for the purpose of writing this test report. Because the roof requires personnel access, a test was determined to be the best way to qualify the roof. The conclusions are that the roof has been qualified for 500-lb total roof load and that the "No Roof Access" signs can be changed to "Roof Access Restricted" signs.

7495 (WHC-SD-PRP-HA–014) **T Plant hazards assessment.** Broz, R.E. Westinghouse Hanford Co., Richland, WA (United States). 27 Sep 1994. 45p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95004756. Source: OSTI; NTIS; INIS; GPO Dep.

This document establishes the technical basis in support of Emergency Planning activities for the T Plant on the Hanford Site. The document represents an acceptable interpretation of the implementing guidance document for DOE ORDER 5500.3A. Through this document, the technical basis for the development of facility specific Emergency Action Levels and the Emergency Planning Zone is demonstrated.

7496 (WHC-SD-SNF-TA–002) **Unreviewed safety question evaluation of 100K East and 100K West in-basin fuel characterization program activities.** Alwardt, L.D. Westinghouse Hanford Co., Richland, WA (United States). 12 Jan 1995. 20p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95005645. Source: OSTI; NTIS; INIS; GPO Dep.

The purpose of this report is to provide the basis for answers to an Unreviewed Safety Question (USQ) safety evaluation of the 105K East (KE) and 105K West (KW) in-basin activities associated with the fuel characterization program as described in the characterization shipping plan. The significant activities that are common to both 105 KE and 105 KW basins are the movement of canisters from their main basin storage locations (or potentially from the 105 KE Tech View Pit if a dump table is available) to the south loadout pit transfer channel, hydrogen generation testing in the single element fuel container, loading the single element fuel container into the shipping cask, loading of the shipping cask onto a flat-bed trailer, return of the test fuel elements or element pieces from the 327 facility, placement of the fuel elements back into Mark 2 canisters, and placement of the canisters in the main storage basin. Decapping of canisters in the south loadout pit transfer channel and re-encapsulation of canisters are activities specific to the 105 KW basin. The scope of this safety evaluation includes only those characterization fuel shipment activities performed in the 105 KE and 105 KW fuel storage basin structures up to installation of the overpack. The packaging safety evaluation report governs the shipment of the fuel elements. The K Basins Plant Review Committee has determined that the in-basin activities associated with the fuel characterization program fuel shipments are bounded by the current safety envelop and do not constitute an unreviewed safety question. This determination is documented on Attachment 1.

7497 (WHC-SD-SNF-TA–003) **Unreviewed safety question evaluation of 100 K West fuel canister gas and liquid sampling.** Alwardt, L.D. Westinghouse Hanford Co., Richland, WA (United States). 12 Jan 1995. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95005646. Source: OSTI; NTIS; INIS; GPO Dep.

The purpose of this report is to provide the basis for answers to an Unreviewed Safety Question (USQ) safety evaluation for the gas and liquid sampling activities associated with the fuel characterization program at the 100 K West (KW) fuel storage basin. The scope of this safety evaluation is limited to the movement of canisters between the main storage basin, weasel pit, and south loadout pit transfer channel (also known as the decapping station); gas and liquid sampling of fuel canisters in the weasel pit; mobile laboratory preliminary sample analysis in or near the 105 KW basin building; and the placement of sample containers in an approved shipping container. It was concluded that the activities and potential accident consequences associated with the gas and liquid sampling of 100 KW fuel canisters are bounded by the current safety basis documents and do not constitute an Unreviewed Safety Question.

7498 (WHC-SD-T100-PMP–001) **Project management plan, Hazardous Materials Management and Emergency Response Training Center.** Borgeson, M.E. Westinghouse Hanford Co., Richland, WA (United States). 12 Dec 1994. 24p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95005288. Source: OSTI; NTIS; INIS; GPO Dep.

For the next 30 years, the main activities at the Hanford Site will involve the handling and cleanup of toxic substances. Thousands of workers involved in these new activities will need systematic training appropriate to their tasks and associated risks. This project is an important part of the Hanford Site mission and will enable the US Department of Energy (DOE) to meet high standards for safety. The Hazardous Materials Management and Emergency Response Training Center (HAMMER) project will construct a centralized regional training center dedicated to training hazardous materials workers and emergency responders in classrooms and with hands-on, realistic training aids representing actual field conditions. The HAMMER Training Center will provide a cost-effective, high-quality way to meet the Hanford Site training needs. The training center creates a partnership among DOE; government contractors; labor; local, state, and tribal governments; and selected institutions of higher education.

7499 (WHC-SD-WM-ANAL–039) **242-A Evaporator Condensate Tank (TK-C-100) tie down evaluation.** Hundal, T.S. Westinghouse Hanford Co., Richland, WA (United States). 23 Jan 1995. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95005975. Source: OSTI; NTIS; INIS; GPO Dep.

The existing Condensate Tank (TK-C-100) in the 242-A Evaporator building is not anchored to the floor slab. This tank is a Safety Class 3 sitting in a Safety Class 2 building. The tank needed to be evaluated to withstand the seismic loads. Anchor bolts have been designed to hold the tank during the seismic event.

7500 (WHC-SD-WM-DP–080) **45-Day safety screening for Tank 241-C-103 push mode sample, riser 2.** Bell, K.E. Westinghouse Hanford Co., Richland, WA (United States). 16 Dec 1994. 17p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95005057. Source: OSTI; NTIS; INIS; GPO Dep.

This is the 45-Day report for the Tank 241-C-103 (C-103) push-mode core sampling characterization effort. Problems encountered with the push-mode sampling truck following removal of the first segment from riser 2 resulted in a long delay before resumption of sampling, therefore it was decided to begin the 45-day clock and issue a report based on receipt of this first segment. If subsequent segments are removed from tank C-103, a revision of this report or a new report will be issued to include any new data. Included are copies of the differential scanning calorimetry (DSC) and thermogravimetric analysis (TGA) scans as requested in Reference 1. Also included is a copy of any immediate notification documentation. Other pertinent documentation will be included in the C-103 216-day report.

7501 (WHC-SD-WM-ER–391) **Rollover analysis of rotary mode core sampler truck No. 2.** Ziada, H.H. Westinghouse Hanford Co., Richland, WA (United States). 8 Nov 1994. 30p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95005429. Source: OSTI; NTIS; INIS; GPO Dep.

This document provides estimate of limiting speed and rollover analysis of rotary mode core sampler truck No. 2 (RMCST No. 2).

7502 (WHC-SD-WM-FHA–006) **Fire hazard analysis for the Westinghouse Hanford Company managed low-level mixed waste Trench 31 and 34.** Howard, B.J. Westinghouse Hanford Co., Richland, WA (United States). 10 Jan 1995. 27p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95005625. Source: OSTI; NTIS; INIS; GPO Dep.

This analysis is to assess comprehensively the risks from fire within the new lined landfills, provided by W-025 and designated Trench 31 and 34 of Burial Ground 218-W-5; they are located in the 200 West area of the Hanford Site, and are designed to receive low-level mixed waste.

7503 (WSRC-MS–94-0418) **Integration of heterogeneous data bases for development of a large-scale environmental data atlas for multi-platform PC and workstation users.** Bresnaham, P.J. (South Carolina Univ., Columbia, SC (United States)); Cowen, D.J.; Jensen, J.R.; Ehler, G.B.; Mackey, H.E. Jr. Westinghouse Savannah River Co., Aiken, SC (United States). [1994]. 14p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. (CONF-9410237–2: 1994 Geographic Information Systems/Land Information Systems (GIS/LIS), Phoenix, AZ (United States), 25-27 Oct 1994). Order Number DE95002689. Source: OSTI; NTIS; INIS; GPO Dep.

Environmental monitoring and restoration at the Department of Energy's Savannah River Site (SRS) requires efficient access to large amounts of diverse spatial data. In order to handle this task the Environmental Sciences Section (ESS) of the Westinghouse Savannah River Company (WSRC) created an environmental data atlas that would use spatial keys to link all data sources to a common data base. These data include extensive information relating to both environmental and man-made features. The data were available in a multitude of different data structures, coordinate systems and formats. The final database also included multimedia information such as airborne multispectral scanner data, aircraft video, photography, bibliographic data, and scanned map bases. It was important that all of the data be readily accessible on the desktop of scientists regardless of the type of computer system they used. The purpose of this paper is to describe the creation of this extensive digital environmental data atlas.

7504 (WSRC-RP–94-01140) **FY94 Office of Technology Development Mixed Waste Operations Robotics Demonstration.** Kriikku, E.M. Westinghouse Savannah River Co., Aiken, SC (United States). 30 Aug 1994. 14p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE95060078. Source: OSTI; NTIS; INIS; GPO Dep.

The Department of Energy (DOE) Office of Technology Development (OTD) develops technologies to help solve waste management and environmental problems at DOE sites. The OTD includes the Robotics Technology Development Program (RTDP) and the Mixed Waste Integrated Program (MWIP). Together these programs will provide technologies for DOE mixed waste cleanup projects. Mixed waste contains both radioactive and hazardous constituents. DOE sites currently store over 240,000 cubic meters of low level mixed waste and cleanup activities will generate several hundred thousand more cubic meters. Federal and state regulations require that this waste must be processed before final disposal. The OTD RTDP Mixed Waste Operations (MWO) team held several robotic demonstrations at the Savannah River Site (SRS) during November of 1993. Over 330 representatives from DOE, Government Contractors, industry, and universities attended. The MWO team includes: Fernald Environmental Management Project (FEMP), Idaho National Engineering Laboratory (INEL), Lawrence Livermore National Laboratory (LLNL), Oak Ridge National Engineering Laboratory (ORNL), Sandia National Laboratory (SNL), and Savannah River Technology Center (SRTC). SRTC is the lead site for MWO and provides the technical coordinator. The primary demonstration objective was to show that robotic technologies can make DOE waste facilities run better, faster, more cost effective, and safer. To meet the primary objective, the demonstrations successfully showed the following remote waste drum processing activities: non-destructive drum examination, drum transportation, drum opening, removing waste from a drum, characterize and sort waste items, scarify metal waste, and inspect stored drums. To further meet the primary objective, the demonstrations successfully showed the following remote waste box processing activities: swing free crane control, workcell modeling, and torch standoff control.

7505 (WSRC-TR–93-301-Rev.3) **Human Reliability Analysis for In-Tank Precipitation Alignment and Startup of Emergency Purge Ventilation Equipment. Revision 3.** Shapiro, B.J.; Britt, T.E. Westinghouse Savannah River Co., Aiken, SC (United States). Oct 1994. 57p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE95060076. Source: OSTI; NTIS; INIS; GPO Dep.

This report documents the methodology used for calculating the human error probability for establishing air based ventilation using emergency purge ventilation equipment on In-Tank Precipitation (ITP) processing tanks 48 and 49 after failure of the nitrogen purge system following a seismic event. The analyses were performed according to THERP (Technique for Human Error Rate Prediction) as described in NUREG/CR-1278-F, "Handbook of Human Reliability Analysis with Emphasis on Nuclear Power Plant Applications." The calculated human error probabilities are provided as input to the Fault Tree Analysis for the ITP Nitrogen Purge System.

7506 (WSRC-TR–94-0224-Rev.1) **Tank 41H bounding uranium enrichment. Revision 1.** Cavin, W.S. Westinghouse Savannah River Co., Aiken, SC (United States). 30 Sep 1994. 15p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE95005012. Source: OSTI; NTIS; INIS; GPO Dep.

The intent of this document is to combine data from salt samples and historical process information to bound the uranium (U-235) enrichment which could be expected in the upper portion of the salt in Tank 41H. This bounding enrichment will be used in another document to establish a nuclear safety basis for initial salt removal operations. Any number of mixing scenarios could have been examined for the components which fed the evaporator during the

formation of the last five feet of salt. The scenario presented was designed to be conservative, while still incorporating process knowledge and available data where possible. In the scenario, the lowest enrichment seen in any feed material was for the L4 feed which was evaporated to form the top part of the salt in Tank 41H. The lowest enrichment of 17% is still higher than the 16% (95% confidence) maximum enrichment actually found at the salt surface (from sample results). This leads to the conclusion that the uranium enrichment of the material (L1) which was being fed to the evaporate when the last five feet began to form, was lower than 22%. The conservatism used in this analysis, combined with the available sample data are believed to provide a defensible basis for establishing an upper bounding enrichment of 22% for the top five feet of salt.

7507 (WSRC-TR–94-0350) **P-Area Acid/Caustic Basin groundwater monitoring report, second quarter 1994.** Westinghouse Savannah River Co., Aiken, SC (United States). Sep 1994. 62p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE95004807. Source: OSTI; NTIS; INIS; GPO Dep.

During second quarter 1994, groundwater from the six PAC monitoring wells at the P-Area Acid/Caustic Basin was analyzed for herbicides/pesticides, radium-226, radium-228, turbidity, and comprehensive constituents. Monitoring results that exceeded the final Primary Drinking Water Standards (PDWS) or the Savannah River Site (SRS) flagging criteria or turbidity standard during the quarter are discussed in this report. During second quarter 1994, no constituents exceeded the final PDWS. Aluminum exceeded its SRS Flag 2 criterion in five PAC wells. Iron and manganese exceeded Flag 2 criteria in three wells, while specific conductance was elevated in one well. Groundwater flow direction and rate in the water table beneath the P-Area Acid/Caustic Basin were similar to past quarters.

7508 (WSRC-TR–94-0524) **Passive control of VOCs using valved well heads: FY1994 report.** Rossabi, J.; Riha, B.D. Westinghouse Savannah River Co., Aiken, SC (United States). 27 Oct 1994. 120p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE95004829. Source: OSTI; NTIS; GPO Dep.

The data described in this report were collected as part of a project to explore the viability of passive soil vapor extraction techniques for removal of volatile organic contaminants from the subsurface. The principal objectives of this project are to determine the mechanism and physical dynamics of the relationship between surface atmospheric pressure and subsurface flow and contaminant transport, and to use this information to design cost effective and efficient remediation systems. This work is funded under the Volatile Organic Compounds - Arid Integrated Demonstration (VOC - Arid ID). The purpose of the VOC - Arid ID is to identify, develop, and demonstrate technologies that may be used to characterize, remediate, and/or monitor and or semiarid sites containing VOC (e.g., carbon tetrachloride and trichloroethylene [TCE]) with or without associated metal and radionuclide contamination. The results from this project are applicable at arid, semi-arid, and non-arid sites. This report documents the methods and findings from the Savannah River Site barometric pumping study. The results in this report include: (1) Surface and subsurface pressure measurements and analysis results from the Savannah River Integrated Demonstration Site (SRIDS). (2) Barometric pumping flow data measured and/or estimated from several wells. (3) Continuous concentration and flow data from one well. (4) development of two computer models that can predict either subsurface pressure or the effective cumulative permeability of the formation in the vertical direction from surface atmospheric pressure data. (5) The derivation of the analytical computer models, the executable code on disk, and written documentation for using the models including examples. The optimization of barometric removal rates using an innovative control valve and the implications of this data for passive extraction systems are discussed.

0550 Safeguards, Inspection, and Accountability

Refer also to citation(s) 7495, 7764, 9131

7509 (KAERI/RR–1268/93) **Technology development for nuclear material accountability.** Hong, Jong Sook (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Lee, Byung Doo; Cha, Hong Ryul; Choi, Hyoung Nae; Na, Won Woo; Park, Ho Joon. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Dec 1993. 103p. (In Korean). Order Number DE95613319. Source: OSTI; NTIS; INIS.

The objective of this study is to contribute efforts to identifying the characteristics and operation reason of known or clandestine nuclear facility. To achieve this purpose is by means of chemical analysis of various samples from process line and surrounding environment. It is possible to assume that the information of the qualitative and quantitative nuclear activities can be obtained by chemically verifying the various samples discharged from specific nuclear facility. Therefore, these techniques may be helpful to identify the presence of undecleared facilities, to detect the falsified operating data and to verify the accounting data. Am-241 dating method is available to detect the actions to conceal the diversion strategy by falsifying operation data of plutonium production facility. Low level counting systems have been used as environmental monitoring in the neighborhood of nuclear facilities, and it is important to optimize experimental conditions (to reduce system background and to improve detection efficiency) for more accurate measurement. These optimized conditions may be useful in establishing low background counting system and counting room. (Author).

7510 (KAERI/RR–1348/93) **Technology development for nuclear material safeguards -A study on the direct use of spent PWR fuel in CANDU-.** Park, Hyeon Soo (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Hong, Jong Sook; Lee, Byeong Doo; Kim, Ho Dong; Cha, Heung Ryeol; Lee, Yong Deok; Choi, Hyeong Nae; Na, Won Woo; Park, Ho Joon. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jul 1994. 108p. (In Korean). Order Number DE95613320. Source: OSTI; NTIS; INIS.

The research contents of the passed one year were the conceptual design of nuclear material measurement points, of near real time accounting system and of unattended monitoring system for detection of nuclear material diversion. The passive neutron detection system was decided as a proper way of detection of plutonium in the spent fuels and the neutrons emitted by each isotopes were investigated. Also, material balance area and major measurement points were selected and related computer code was used for the near real time accounting in DUPIC facility. (Author).

7511 (SAND–88-0824C) **An overview of technology, equipment and applications.** Miyoshi, D.S. Sandia National Labs., Albuquerque, NM (United States). [1988]. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. (CONF-880580–1: Symposium on gas company security, Chicago, IL (United States), 2 May 1988). Order Number DE88007607. Source: OSTI; NTIS; GPO Dep.

Sandia National Laboratories is the Center of Excellence in Physical Security for the US Department of Energy. Sandia conducts research and development in aspects of physical security concerned with the protection of DOE assets. Sandia provides the focal point for evaluation of new technologies and the conduct of high-risk endeavors on the behalf of the DOE complex. Our work in remote detection technology has been to develop and evaluate a spectrum of tools that can detect the presence of an intruder. A variety of sensors exist that fall into one of the following categories: point sensors, line sensors, and area sensors. These sensors utilize all types of physical phenomena, including seismic and acoustic energy, visible and infrared devices, strain transducers, and electric and magnetic fields. In addition, any system that results in an alarm also requires some types of an assessment system. Closed-circuit TV is most commonly used to assess the causes of alarms, although manual assessment is also used. Development and evaluation of CCTV components are aimed at increasing performance at lower cost and maintenance requirements. in applying technology to security problems, systems aspects should also be considered, such as threat analysis, target analysis, vulnerability assessment, reliability, and operational impact. Security systems can be cost effective if the proper planning has taken place.

7512 (WHC-SD-339-SDR–002-Rev.1) **Vault Safety and Inventory System users manual, PRIME 2350. Revision 1.**

Downey, N.J. Westinghouse Hanford Co., Richland, WA (United States). 14 Dec 1994. 47p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95005634. Source: OSTI; NTIS; INIS; GPO Dep.

This revision is issued to request review of the attached document: VSIS User Manual, PRIME 2350, which provides user information for the operation of the VSIS (Vault Safety and Inventory System). It describes operational aspects of Prime 2350 minicomputer and vault data acquisition equipment. It also describes the User's Main Menu and menu functions, including REPORTS. Also, system procedures for the Prime 2350 minicomputer are covered.

0560 Legislation and Regulations

Refer also to citation(s) 7280, 7281, 7440, 7682, 7684

7513 (IAEA-TECDOC–766, pp. 95-107) **HM nuclear installation inspectorate's experience of the regulatory control of the storage, handling and transport of civil plutonium in the United Kingdom.** Britten, I.N. (HM Nuclear Installations Inspectorate, Bootle, Merseyside (United Kingdom)). International Atomic Energy Agency, Vienna (Austria). Oct 1994. (CONF-9310405–: Technical committee meeting on safe handling, transport and storage of plutonium, Vienna (Austria), 18-21 Oct 1993). In *Safe handling, transport and storage of plutonium. Proceedings of a technical committee meeting held in Vienna, 18-21 October 1993.* 120p. Order Number DE95614900. Source: OSTI; NTIS (US Sales Only); INIS.

This paper outlines the way in which regulatory control is exercised over those installations that store, handle and transport civil plutonium in the United Kingdom. It describes some of the difficulties that have arisen in such regulation but concludes that the present arrangements for licensing civil installations provide ample control of the potential dangers associated with increasing quantities of plutonium in circulation. The views expressed are those of the author and other HM Nuclear Installations Inspectors who have been actively involved in the regulatory inspection of licensed plutonium-handling facilities. (author). 1 ref.

7514 (INIS-mf–14429) **Statutory Instruments No 144 of 1994. European Communities (Protection of outside workers from ionising radiation) Regulations, 1994.** Ireland. Apr 1994. 11p. Order Number DE95616224. Source: OSTI; NTIS (US Sales Only); INIS.

These Regulations implement Council Directive 90/641 EURATOM of 4 December, 1990 on the operational protection of outside workers exposed to the risk of ionising radiation during their activities in controlled areas. The Regulations provide for the radiation protection of workers liable to receive an exposure of high radiation levels while working away from their employers' premises. The Regulations also apply to workers who come from, or who go to work in, another Member State of the European Community.

07 ISOTOPE AND RADIATION SOURCE TECHNOLOGY

0701 Physical Isotope Separation

7515 (KAERI/RR–1142/92) **Development of polymer catalyst manufacturing technology.** Chung, Heung Seok (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Kim, Yong Ik; Lee, Han Soo; Kang, Hui Seok; Seong, Ki Ung; Na, Jeong Won; An, Do Hui; Kim, Kwang Rak; Cho, Young Hyeon; Baek, Seung Uh; Jeong, Yong Won. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jan 1993. 217p. (In Korean). Order Number DE95612651. Source: OSTI; NTIS; INIS.

Heavy water is used as moderator and coolant in Pressurized Heavy Water Power Plants. According to the governmental long-term plan for power supply, Korea is scheduled to construct new six pressurized heavy water power plants till the year 2006. Total heavy water demand for these plants would be 3892 Mg during the period 1992-2006. Reformed hydrogen processes are considered best suited to Korea. Hydrophobic catalysts for this process were manufactured and the performance of hydrogen isotope exchance was investigated. The overall mass transfer coefficients varied between 0.004 and 2.295 m^3 HD/m^3 Bed.sec. and heavy water separation processes using the catalysts were optimized. (Author).

7516 (KAERI/RR–1248/93) **Development of the separation and manufacturing technology for medical and industrial stable isotopes by using laser.** Lee, Jong Min (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Cha, Hyung Ki; Cha, Byung Heon; Rhee, Young Joo; Yoo, Byung Duk; Song, Kyu Seok; Choi, An Sung; Baik, Dae Hyun; Kim, Jung Bok; Jeong, Eui Chang; Han, Jae Min; Kim, Sung Ho; Ko, DoKorea Cancer Center Hospital, Seoul (Korea, Republic of). Sep 1993. 143p. (In Korean). Order Number DE95612654. Source: OSTI; NTIS; INIS.

Comprehensive spectroscopic data for Yb atoms were experimentally collected, the optimum photoionization scheme was reasoned from the data, and the effect of laser characteristics on isotope selectivity was analyzed. The detailed designs for a 15W copper vapor laser and a 5W tunable laser were completed. The oscillator, the air-cooled laser plasma tube, the high voltage pulse generator, the buffer gas supplier, the automatic controller for the CVL system, and the SLM (single longitudinal mode) oscillator for the tunable laser system have been constructed. A vaccum chamber and an atomic beam generator for the high density ion separator system were designed and constructed. The computer simulation code for ion extraction was also developed. (Author).

7517 (KAERI/RR–1259/93) **A study on the polymer catalyst manufacturing technology.** Chung, Heung Seok (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Lee, Han Soo; Kang, Hee Seok; Paek, Seung Uh; Kim, Kwang Rak; Koo, Jee Hyu; Chung, Yong Won; Sung, Ki Ung; Na, Jeong Won; Hwang, Seong Tae; Kim, Yong Ik; Choi, Yoon Dong. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jan 1994. 238p. (In Korean). Order Number DE95612652. Source: OSTI; NTIS; INIS.

Heavy water is used as moderator and coolant in Pressurized Heavy Water Power Plants. According to the governmental long-term plan for power supply, Korea is scheduled to construct new four pressurized heavy water power plants till the year 2006. Total heavy water demand for these plants would be 1988 Mg during the period 1992-2006. Reformed hydrogen processes is considered best suited to Korea. Hydrophobic catalysts for this process were manufactured and the performance of hydrogen isotope exchance was investigated. The overall mass transfer coefficients varied between 0.004 and 2.295 m^3 HD/m^3 Bed.sec. and heavy water separation processes using the catalysts were optimized. (Author).

7518 (KAERI/RR–1319/94) **A feasibility study on the industialization of catalytic process in connection with domestic chemical plants.** Chun, Kwan Sik (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Chung, Heung Seok; Lee, Han Soo; Park, Chang Jin; Kim, Jong Ho; Koo, Jee Hyu; Lee, Han Myeong. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jun 1994. 129p. (In Korean). Order Number DE95612653. Source: OSTI; NTIS; INIS.

The technical and economical feasibility on the polymer catalytic process for the production of heavy water in corporating domestic hydrogen reforming plants (RHEX) were performed. It was suggested to run the RHEX process as a closed system to reduce the loss of concentrated deuterium. As a part of solution to this problem the method of recycling methane gas out of the process and of purifying the water from the hydrogen reforming process have been considered. The controlling factor affecting the unit production cost depends on the cost of polymer catalyst rather than the investment cost. If the catalyst would be produced with the suitable price, the proposed process could be quite competitive comparing with other heavy water production processes. (Author).

7519 (KAERI/RR–1362/93) **Studies on the production and application of radioisotopes -Studies on application of radiation and radioisotopes-.** Kim, Jae Rok (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Park, Kyung Bae; Chung, Yong Sam; Chung, Young Ju; Bang, Hong Sik; Han, Hyun Soo; Shin, Byung Chul; Park, Choon Deuk; Han, Kwang Hee; Shin, Hun Young; Park, Woong Woo; Kim, Dong SoKorea Cancer Center

Hospital, Seoul (Korea, Republic of). Jul 1994. 180p. (In Korean). Order Number DE95612655. Source: OSTI; NTIS; INIS.

To increase the production of RI and labelled compounds utilizing the Korea Multipurpose Research Reactor (KMRR), development of P-32 production process, devices and tools of neutron irradiation use, GMP facilities of radiopharmaceuticals, Dy-165/Ho-166 macroaggregate of radiation synovectomy use for rheumatoid archritis have been carried out, respectively. To utilize NAA in analysis of environmental samples, experimental studies on air borne samples have also been carried out. An efficient P-32 production process obtaining high recovery of >98% with sufficiently high radionuclidic purity of >99% has been established through reaction $^{32}S(n,p)^{32}P$ and subsequent reduced pressure distillation purification. Various capsules, loading/unloading device for capsule/rigs, cole-welder for capsules, checking instrument for capsule sealing, working table/tools, transfer cask for the irradiated targets, etc. have been developed. To maintain cleanliness inside of hot cells, a modification has been proposed, and a two door type autoclave usable in GMP facility has been prepared. An efficient way of preparation of the Dy-165/Ho-166 macroaggregate of radiation synovectomy use as well as its clinical application scheme has been developed. A suitable process of environmental sample analyses has been established by carrying out NAA of standard/reference samples as well as airborne dust samples. (Author).

0702 Radiation Sources

7520 (JINR-D–15-93-80, pp. 47-52) **State of and trends in the development of Burgas centre for electron-beam technologies and polymers.** Kostov, G.K.; Kat'rov, P.D. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1993. 119p. (In Russian). (CONF-9209490–: Workshop on application of microtrons in nuclear physics, Plovdiv (Bulgaria), 22-24 Sep 1992). In *Microtron MT-25. Workshop on application of microtrons in nuclear physics.* Order Number DE95611718. Source: OSTI; NTIS (US Sales Only); INIS.

Present-day status and opportunities of scientific and industrial development of radiation-chemical technologies at the Centre of electron-beam technologies and polymers at the Higher institute of chemical technology in Burgas, Bulgaria, are reviewed. The electron-beam accelerator will be preeminently employed in pilot plants for the development of radiation technologies in industry. A number of research problems associated with radiation chemistry will allow promising results be obtained in the field of polymer technologies, ecology, biotechnology, etc. 12 refs.

7521 (JINR-E–3-94-227) **Production and Storage of Ultracold Neutrons at Pulse Neutron Sources with Low Repetition Rates.** Pokotilovski, Yu.N. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Neutron Physics. 1994. 6p. Order Number DE95612942. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Nuclear Instruments and Methods.

High densities of ultracold neutrons can be stored in experimental volumes if one uses pulse thermal neutron source with a low repetition rate, a very low temperature converter, a high quality curved neutron guide and a shutter at the entrance window of the storage volume. (author). 9 refs.; 3 figs.

7522 (KAERI/RR–1292/93) **Operation of the irradiation facilities.** Jin, Joon Ha (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Yoon, Byeong Mok; Kim, Ki Yeop; No, Yeong Chang; Lee, Yeong Keun; Park, Soon Cheol; Na, Bong Joo. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Dec 1993. 59p. (In Korean). Order Number DE95612664. Source: OSTI; NTIS; INIS.

It is necessary to efficiently manage and operate the irradiation facilities which are used for the various basic and practical application studies as well as for the industrialization of the radiation technology. Dose distribution measurements were carried out to calculate the accurate irradiation dose as our high intensity gamma irradiator was dismantled in Seoul and re-installed in Taejon. The irradiator was operated for the purpose of researches on radiation-related technology and irradiation service after getting approval from KINS. Dose distribution on the irradiation table installed on the northern side of the high intensity gamma irradiator was measured using 137 red acrylic dosimeters and 425 ceric-cerous dosimeters. The data were used for the accurate irradiation of samples. The average dose, standard deviation of dose and deviation rate of dose on the various positions were calculated to identify the variation of dose uniformity caused by the difference in sample size. Our ceric-cerous dosimeter was calibrated through IAEA international dose assurance service. It was reported that our dosimeter showed comparatively low error of -4.05%. On the basis of the results, the correction factor for the dosimeter system could be determined. The high intensity gamma irradiator operated for 290.7 hours for dose distribution measurement, 53.6 hours for test operation, and 7.9 hours for maintenance and checking. The irradiator was operated 31 times to irradiate 17 different kinds of sample from 6 research groups and 3 domestic companies. The low intensity gamma irradiator was designed and its safety against imaginary accident was confirmed by computer analysis.

7523 (KAERI/RR–1366/93) **Studies on radiation processing -Studies on application of radiation and radioisotopes-.** Jin, Joon Ha (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Yoon, Byeong Mok; Kim, Ki Yeop; Nho, Yeong Chang; Lee, Yeong Keun; Park, Soon Cheol; Na, Bong Joo; Kim, Jae Ho. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Aug 1994. 156p. (In Korean). Order Number DE95612665. Source: OSTI; NTIS; INIS.

Radiation-grafting of acrylic acid onto LDPE was carried out by both simultaneous irradiation and pre-irradiation techniques. The effects of metal salts, and sulfuric acid addition, and solvent effect on enhancement of grafting yield were evaluated. The dose distributions of the Co-60 gamma irradiation facility and electron beam accelerator were measured using chemical dosimeters and CTA film dosimeters, respectively. An appropriate base PP was selected, and the effects of addition of various additives on the radiation resistance of the polymer. An air distillation column was examined using a Co-60 source to identify the origin of the malfunction of the column. (Author).

7524 (KFK–5296) **Proceedings of the IEA-workshop on intense neutron sources. IEA-implementing agreement for a programme of research and development on fusion materials. Working group task - annex II.** Ehrlich, K. (ed.); Daum, E. (ed.). Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Materialforschung; Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Kernfusion; Association Euratom-Kernforschungszentrum Karlsruhe GmbH (KFK) (Germany). May 1994. 310p. (CONF-9209212–: International Energy Agency (IEA) workshop on intense neutron sources, Karlsruhe (Germany), 21-23 Sep 1992). Order Number DE95738768. Source: OSTI; NTIS (US Sales Only); INIS.

The volume contains 22 contributions in which the new studies of various possible neutron source concepts and the results of the comparison studies for evaluating different candidates are reported. The general strategies for the development of structural materials for future fusion reactors are discussed also.

7525 (KFK–5296, pp. 127-152) **Summary of ESNIT.** Noda, K. (JAERI, Tokai Research Establishment, Ibaraki (Japan)). Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Materialforschung; Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Kernfusion; Association Euratom-Kernforschungszentrum Karlsruhe GmbH (KFK) (Germany). May 1994. 310p. (CONF-9209212–: International Energy Agency (IEA) workshop on intense neutron sources, Karlsruhe (Germany), 21-23 Sep 1992). In *Proceedings of the IEA-workshop on intense neutron sources. IEA-implementing agreement for a programme of research and development on fusion materials. Working group task - annex II.* Order Number DE95738768. Source: OSTI; NTIS (US Sales Only); INIS.

In the paper are presented the concept of Energy Selective Neutron Irradiation Test Facilities (ESNIT), the current status of the technical activities and the material researches to be performed using ESNIT.

7526 (KFK–5296, pp. 153-171) **The high intensity D-Li source.** Saltmarsh, M.J. (Oak Ridge National Lab., TN (United

States)). Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Materialforschung; Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Kernfusion; Association Euratom-Kernforschungszentrum Karlsruhe GmbH (KFK) (Germany). May 1994. 310p. (CONF-9209212--: International Energy Agency (IEA) workshop on intense neutron sources, Karlsruhe (Germany), 21-23 Sep 1992). In *Proceedings of the IEA-workshop on intense neutron sources. IEA-implementing agreement for a programme of research and development on fusion materials. Working group task - annex II.* Order Number DE95738768. Source: OSTI; NTIS (US Sales Only); INIS.

The paper presents in foil form the U.S. neutron source effort which is concentrated on the D-Li concept.

7527 (KFK--5296, pp. 173-189) **The intense T-H_2O neutron source.** Cierjacks, S. (Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Materialforschung 1). Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Materialforschung; Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Kernfusion; Association Euratom-Kernforschungszentrum Karlsruhe GmbH (KFK) (Germany). May 1994. 310p. (CONF-9209212--: International Energy Agency (IEA) workshop on intense neutron sources, Karlsruhe (Germany), 21-23 Sep 1992). In *Proceedings of the IEA-workshop on intense neutron sources. IEA-implementing agreement for a programme of research and development on fusion materials. Working group task - annex II.* Order Number DE95738768. Source: OSTI; NTIS (US Sales Only); INIS.

The paper presents in foil form the general features of an intense t-H_2O source.

7528 (KFK--5296, pp. 191-202) **Target design analysis for an intense T-H_2O neutron source.** Malang, S. (Kernforschungszentrum Karlsruhe GmbH (Germany). IATF). Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Materialforschung; Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Kernfusion; Association Euratom-Kernforschungszentrum Karlsruhe GmbH (KFK) (Germany). May 1994. 310p. (CONF-9209212--: International Energy Agency (IEA) workshop on intense neutron sources, Karlsruhe (Germany), 21-23 Sep 1992). In *Proceedings of the IEA-workshop on intense neutron sources. IEA-implementing agreement for a programme of research and development on fusion materials. Working group task - annex II.* Order Number DE95738768. Source: OSTI; NTIS (US Sales Only); INIS.

The paper presents in foil form the target design analyses for an intense t-H_2O neutron source.

7529 (KFK--5296, pp. 255-264) **Proposal of an intense 14 MeV neutron source based on μCF.** Monti, S. (ENEA, Bologna (Italy)). Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Materialforschung; Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Kernfusion; Association Euratom-Kernforschungszentrum Karlsruhe GmbH (KFK) (Germany). May 1994. 310p. (CONF-9209212--: International Energy Agency (IEA) workshop on intense neutron sources, Karlsruhe (Germany), 21-23 Sep 1992). In *Proceedings of the IEA-workshop on intense neutron sources. IEA-implementing agreement for a programme of research and development on fusion materials. Working group task - annex II.* Order Number DE95738768. Source: OSTI; NTIS (US Sales Only); INIS.

The paper presents the possibility of a high-intensity 14MeV neutron source based on muon-catalyzed fusion for accelerated end-of-life testing of fusion reactor materials.

7530 (KFK--5296, pp. 265-269) **Some information and remarks concerning plans to build a European spallation source for neutron scattering application.** Ullmaier, H. (Forschungszentrum Juelich GmbH (Germany). Inst. fuer Festkoerperforschung). Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Materialforschung; Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Kernfusion; Association Euratom-Kernforschungszentrum Karlsruhe GmbH (KFK) (Germany). May 1994. 310p. (CONF-9209212--: International Energy Agency (IEA) workshop on intense neutron sources, Karlsruhe (Germany), 21-23 Sep 1992). In *Proceedings of the IEA-workshop on intense neutron sources. IEA-implementing agreement for a programme of research and development on fusion materials. Working group task - annex II.* Order Number DE95738768. Source: OSTI; NTIS (US Sales Only); INIS.

The paper presents in foil form some information and remarks concerning plans to build a European spallation source for neutron scattering applications.

7531 (KFK--5296, pp. 273-298) **Summary of IEA neutron source working group activities.** Doran, D. (Washington State Univ., Spokane, WA (United States)). Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Materialforschung; Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Kernfusion; Association Euratom-Kernforschungszentrum Karlsruhe GmbH (KFK) (Germany). May 1994. 310p. (CONF-9209212--: International Energy Agency (IEA) workshop on intense neutron sources, Karlsruhe (Germany), 21-23 Sep 1992). In *Proceedings of the IEA-workshop on intense neutron sources. IEA-implementing agreement for a programme of research and development on fusion materials. Working group task - annex II.* Order Number DE95738768. Source: OSTI; NTIS (US Sales Only); INIS.

The paper presents in foil form a summary of IEA neutron source working group.

7532 (KFK--5296, pp. 299-309) **The possibilities for a staged approach in the development of intense neutron sources.** Miyahara, A. (Teikyo Univ., Tokyo (Japan)). Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Materialforschung; Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Kernfusion; Association Euratom-Kernforschungszentrum Karlsruhe GmbH (KFK) (Germany). May 1994. 310p. (CONF-9209212--: International Energy Agency (IEA) workshop on intense neutron sources, Karlsruhe (Germany), 21-23 Sep 1992). In *Proceedings of the IEA-workshop on intense neutron sources. IEA-implementing agreement for a programme of research and development on fusion materials. Working group task - annex II.* Order Number DE95738768. Source: OSTI; NTIS (US Sales Only); INIS.

The paper analyses in foil form the possibilities for a staged approach in the development of intense neutron sources.

7533 (ORNL--6821) **Advanced Neutron Source (ANS) Project progress report, FY 1994.** Campbell, J.H. (Oak Ridge National Lab., TN (United States)); King-Jones, K.H. (eds.); Selby, D.L.; Harrington, R.M.; Thompson, P.B. Oak Ridge National Lab., TN (United States). Jan 1995. 108p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE95005923. Source: OSTI; NTIS; INIS; GPO Dep.

The President's budget request for FY 1994 included a construction project for the Advanced Neutron Source (ANS). However, the budget that emerged from the Congress did not, and so activities during this reporting period were limited to continued research and development and to advanced conceptual design. A significant effort was devoted to a study, requested by the US Department of Energy (DOE) and led by Brookhaven National Laboratory, of the performance and cost impacts of reducing the uranium fuel enrichment below the baseline design value of 93%. The study also considered alternative core designs that might mitigate those impacts. The ANS Project proposed a modified core design, with three fuel elements instead of two, that would allow operation with only 50% enriched uranium and use existing fuel technology. The performance penalty would be 15–20% loss of thermal neutron flux; the flux would still just meet the minimum design requirement set by the user community. At the time of this writing, DOE has not established an enrichment level for ANS, but two advisory committees have recommended adopting the new core design, provided the minimum flux requirements are still met.

7534 (PINSTECH-RIAD--137) **Review of neutron radiographic applications in industrial and biological systems.** Ashraf, M.M. (Pakistan Inst. of Nuclear Science and Technology, Islamabad (Pakistan). Radiation and Isotope Application Div.); Khan, A.R. Pakistan Inst. of Nuclear Science and Technology, Islamabad (Pakistan). Radiation and Isotope Application Div. Oct 1992. 27p. Order Number DE95615771. Source: OSTI; NTIS (US Sales Only); INIS.

13 fig.

Neutron radiography is a non-destructive testing technique and is being used worldwide for the design and the development of reactor fuels for research and power reactors. It is also being used for non-destructive examination of nuclear industrial products. In addition to its explosives and other industrial sectors. In addition to its applications in industrial sectors, the technique is widely used for research and development activities in biological systems. A review of technical applications of neutron radiography in different fields particularly in nuclear fuel management, aerospace industry, explosives and biology is presented. The methodology of neutron radiography is also discussed in detail along with the advantages of the technique. In addition, the potential of the neutron radiography facility at PINSTECH has been described. (author). 13 fig.

08 HYDROGEN

0801 Production

Refer also to citation(s) 7568

7535 (KE–93004S) **Study on the hydrogen reaction technologies related to the chemical heat pump system (II).** Sim, K.S. (Korea Institute of Energy Research, Taejon (Korea, Republic of)); Son, Y.M.; Park, J.S.; Kim, J.W.; Kim, Y.S.; Lee, S.H.; Myong, K.S.; Park, K.B.; Seo, J.M. No corporate text available. Oct 1994. 169p. (In Korean). Order Number DE95744286. Source: OSTI; NTIS (US Sales Only).

The feasibility study on aceton/2-propanol heat pump system was conducted through experimental systems with the hydrogenation of acetone and the dehydrogenation of 2-propanol. The optimum reaction conditions of hydrogenation and dehydrogenation were determined as follows : For the hydrogenation reaction, Cu-Cr type catalyst showed good activity at the reaction temperature of 150 oC and 4 of the mole ratio of hydrogen and acetone. 5% Ru catalyst based on activated carbon is the best one at the reaction temperature of 83 oC for the dehydrogenation of 2-propanol. (author). refs., figs., tabs.

0802 Storage, Transport, and Handling

7536 (NYSERDA–94-20) **Hydrogen storage on activated carbon. Final report.** Schwarz, J.A. (Syracuse Univ., NY (United States). Dept. of Chemical Engineering and Materials Science). New York State Energy Research and Development Authority, Albany, NY (United States); Ontario Ministry of Energy, Toronto, ON (Canada); Syracuse Univ., NY (United States). Dept. of Chemical Engineering and Materials Science. Nov 1994. 36p. Sponsored by New York State Energy Research and Development Authority, Albany, NY (United States). Source: OSTI; New York State Energy Research and Development Authority, Two Rockefeller Plaza, Albany, NY 12223 (United States).

The project studied factors that influence the ability of carbon to store hydrogen and developed techniques to enhance that ability in naturally occurring and factory-produced commercial carbon materials. During testing of enhanced materials, levels of hydrogen storage were achieved that compare well with conventional forms of energy storage, including lead-acid batteries, gasoline, and diesel fuel. Using the best materials, an electric car with a modern fuel cell to convert the hydrogen directly to electricity would have a range of over 1,000 miles. This assumes that the total allowable weight of the fuel cell and carbon/hydrogen storage system is no greater than the present weight of batteries in an existing electric vehicle. By comparison, gasoline cars generally are limited to about a 450-mile range, and battery-electric cars to 40 to 60 miles. The project also developed a new class of carbon materials, based on polymers and other organic compounds, in which the best hydrogen-storing factors discovered earlier were "molecularly engineered" into the new materials. It is believed that these new molecularly engineered materials are likely to exceed the performance of the naturally occurring and manufactured carbons seen earlier with respect to hydrogen storage.

09 BIOMASS FUELS

Refer also to citation(s) 8221

7537 (ETDE-DE–12) **Bundesforschungsanstalt fuer Landwirtschaft Braunschweig-Voelkenrode (FAL). Annual report 1992.** Bundesforschungsanstalt fuer Landwirtschaft, Braunschweig (Germany). 1993. 245p. (In German). Order Number DE95738876. Source: OSTI; NTIS (US Sales Only).

The institution was founded for the task of preserving and maintaining the natural resources of agricultural ecosystems, as well as for the further development of food and raw materials production, biotechnology, Technology assessment, and evaluation of future developments in agriculture. (orig./EF)

0907 Resources

Refer also to citation(s) 8597

7538 (SLU-EKOMIL-R–67) **Frost resistance in Salix.** Fircks, H.A. von. Swedish Univ. of Agricultural Sciences, Uppsala (Sweden). Dept. of Ecology and Environmental Research. 1994. 79p. Order Number DE95737677. Source: OSTI; NTIS.

This thesis presents results from a series of studies in various aspects of frost hardiness in Salix viminalis and Salix dasyclados. The seasonal development of frost resistance and the processes which lead to frost damage under different environmental and laboratory test conditions are elucidated, and current methods to evaluate plant response to temperature stress are developed further. A number of phases in the seasonal development of frost resistance can be distinguished, in which the susceptibility of plants to frost ranges from low (dormant stage) to high (growth stage). Changes in phenological characters, ultrastructural cell features, activity of the vascular cambium and storage products (starch, proteins) are correlated with the changes in frost resistance during the annual growth cycle. Differences in relative growth rates imposed by nutrient conditions also affected onset time and rate of frost hardiness development and deacclimation and onset of growth during spring. Dormant stem cutting of various Salix species and clones collected outdoors during winter or subjected to a standardized artificial hardening regime at -4 degrees C survived exposure to at least 85 degrees C. The presence of ice on wintering shoots will restrict freezing avoidance of shoot to above -4 degrees C. Early formation of extracellular ice at -1 degrees C to -4 degrees C, followed by associated high tolerance to freeze-induced dehydration, was concluded to be an important survival mechanism for all winter-dormant Salix plant. Salix species have the inherent ability to develop adequate tolerance to the low winter temperatures in Scandinavian conditions. 304 refs, 8 figs, 11 tabs

0908 Production

Refer also to citation(s) 8179

7539 (DOE/BP/66088–1) **A handbook for small-scale densified biomass fuel (pellets) manufacturing for local markets.** Folk, R.L.; Govett, R.L. Idaho Univ., Moscow, ID (United States). Coll. of Forestry, Wildlife and Range Sciences. Jul 1992. 143p. Sponsored by USDOE, Washington, DC (United States). DOE Contract BI79-87BP66088. Order Number DE95005618. Source: OSTI; NTIS; GPO Dep.

Wood pellet manufacturing in the Intermountain West is a recently founded and rapidly expanding energy industry for small-scale producers. Within a three-year period, the total number of manufacturers in the region has increased from seven to twelve (Folk et al., 1988). Small-scale industry development is evolving because a supply of raw materials from small and some medium-sized primary and secondary wood processors that has been largely unused. For the residue producer considering pellet fuel manufacturing, the wastewood generated from primary products often carries a cost associated with residue disposal when methods at-e stockpiling, landfilling or incinerating. Regional processors use these methods for a variety of reasons, including the relatively small amounts of residue produced, residue form, mixed residue types, high transportation costs and lack of a local market, convenience and absence of regulation. Direct costs associated with

residue disposal include the expenses required to own and operate residue handling equipment, costs for operating and maintaining a combustor and tipping fees charged to accept wood waste at public landfills. Economic and social costs related to environmental concerns may also be incurred to include local air and water quality degradation from open-air combustion and leachate movement into streams and drinking water.

7540 (KE–93006G) **Process development for energy and compost recovery from biogradable municipal solid waste.** Park, S.C. (Korea Institute of Energy Research, Taejon (Korea, Republic of)); Hong, C.J; Lee, J.S.; Lee, J.P. No corporate text available. Dec 1993. 116p. (In Korean). Order Number DE95744263. Source: OSTI; NTIS (US Sales Only).

The goal of this study is to develop a process for energy and compost recovery from anaerobic composting of biogradable MSW and to practical use.The methane yield and anaerobic degradability of bibimbab waste were 471 ml CH4/g VS added and 86% respectively. After digestion, The total solid was reduced by about 90% and 80-90% in batch and continuous experiments respectively. Based on experimental results, mini pilot scale anaerobic digestion system, in which 70L solid-bed reactor for acid fermentation was connected to 200L methane fermentation in series, was constructed. (author). refs., figs., tabs.

7541 (VTT-BIOENERGIA–4) **Research projects in 1994.** Alakangas, E. (ed.). VTT Energy, Jyvaeskylae (Finland). Biofuels. 1994. 103p. (In Finnish, English). Project KTM-455/881/92. Order Number DE95737611. Source: OSTI; NTIS.

Bioenergy Research Programme.

The Bioenergy Research Programme are: production of wood fuels, peat production, use of bioenergy and conversion of biomass. The most important area of investigation within research on wood fuel production is the development of various methods, machines and systems connected to this area, in order to produce economically competitive fuel. Integrated harvesting appears to have the most promising potential in this area. The central research focuses in peat production research are the utilization of all the peat available in a bog and the development of peat production methods and machines. Development work in this area aims at decreasing of the production costs and also at decreasing of the waste water and other elements of environmental load around the peat production sites. In the long term, the increase of bioenergy in the space heating of small houses and farms, as well as in the production of heat and electricity are the central areas in the use of bioenergy research. The research into the conversion of fuels is concentrated on the production of biomass-based liquid fuels. This publication contains information on research projects in progress in 1994 both in Finnish and in English. The entries have been arranged according to the research field. About 50 projects will be carried out in 1994. The information of public research projects includes the title, the project code, organization, schedule, funding, cooperating organizations and abstract. The joint development and assessment and demonstration projects financed by industry are also listed.

0909 Processing

Refer also to citation(s) 7540, 7570

7542 (BNL–52452) **Prospects for pyrolysis technologies in managing municipal, industrial, and DOE cleanup wastes.** Reaven, S.J. (State Univ. of New York, Stony Brook, NY (United States)). Brookhaven National Lab., Upton, NY (United States); State Univ. of New York, Stony Brook, NY (United States). Dec 1994. 86p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. Order Number DE95006729. Source: OSTI; NTIS; INIS; GPO Dep.

Pyrolysis converts portions of municipal solid wastes, hazardous wastes, and special wastes such as tires, medical wastes, and even old landfills into solid carbon and a liquid or gaseous hydrocarbon stream. Pyrolysis heats a carbonaceous waste stream typically to 290–900 C in the absence of oxygen, and reduces the volume of waste by 90% and its weight by 75%. The solid carbon char has existing markets as an ingredient in many manufactured goods, and as an adsorbent or filter to sequester certain hazardous wastes. Pyrolytic gases may be burned as fuel by utilities, or liquefied for use as chemical feedstocks, or low-pollution motor vehicle fuels and fuel additives. This report analyzes the potential applications of pyrolysis in the Long Island region and evaluates for the four most promising pyrolytic systems their technological and commercial readiness, their applicability to regional waste management needs, and their conformity with DOE requirements for environmental restoration and waste management. This summary characterizes their engineering performance, environmental effects, costs, product applications, and markets. Because it can effectively treat those wastes that are inadequately addressed by current systems, pyrolysis can play an important complementing role in the region's existing waste management strategy. Its role could be even more significant if the region moves away from existing commitments to incineration and MSW composting. Either way, Long Island could become the center for a pyrolysis-based recovery services industry serving global markets in municipal solid waste treatment and hazardous waste cleanup. 162 refs.

7543 (DOE/GO–10094-037) **Biologically produced succinic acid: A new route to chemical intermediates.** National Renewable Energy Lab., Golden, CO (United States). [1995]. 3p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC36-83CH10093. Order Number DE95000257. Source: OSTI; NTIS; GPO Dep.

The US Department of Energy (DOE) Alternative Feedstocks (AF) program is forging new links between the agricultural community and the chemicals industry through support of research and development (R & D) that uses 'green' feedstocks to produce chemicals. The program promotes cost-effective industrial use of renewable biomass as feedstocks to manufacture high-volume chemical building blocks. Industrial commercialization of such processes would stimulate the agricultural sector by increasing the demand of agricultural and forestry commodities. New alternatives for American industry may lie in the nation's forests and fields. The national laboratory consortium has undertaken a joint R&D project with the Michigan Biotechnology Institute to demonstrate the feasibility of producing a chemical intermediate, succinic acid, and various derivatives, from renewable agricultural resources.

7544 (DOE/GO–10094-039) **Clean fractionation of biomass.** National Renewable Energy Lab., Golden, CO (United States). [1995]. 3p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC36-83CH10093. Order Number DE95000259. Source: OSTI; NTIS; GPO Dep.

The US Department of Energy (DOE) Alternative Feedstocks (AF) program is forging new links between the agricultural community and the chemicals industry through support of research and development (R & D) that uses 'green' feedstocks to produce chemicals. The program promotes cost-effective industrial use of renewable biomass as feedstocks to manufacture high-volume chemical building blocks. Industrial commercialization of such processes would stimulate the agricultural sector by increasing the demand of agricultural and forestry commodities. New alternatives for American industry may lie in the nation's forests and fields. The AF program is conducting ongoing research on a clean fractionation process. This project is designed to convert biomass into materials that can be used for chemical processes and products. Clean fractionation separates a single feedstock into individual components cellulose, hemicellulose, and lignin.

7545 (FAAR–23/1993, pp. 92-97) **A laminar entrained flow reactor for the study of aerosol formation and deposition during black liquor combustion and pyrolysis.** Sinquefield, S.A. (Oregon State Univ. Corvallis, OR (United States). Chemical Engineering Dept.); Frederick, W.J.; Mikkanen, P.; Kauppinen, E.I. Finnish Association for Aerosol Research, Espoo (Finland). 1993. (CONF-9306401–: 5. Finnish national aerosol symposium, Espoo (Finland), 1-3 Jun 1993). In *Report series in aerosol science.* 292p. Order Number DE95737628. Source: OSTI; NTIS.

The sub-micron aerosol (fume) particles in kraft recovery boilers play an important role in sulphur capture and control of SO_2 but they also contribute significantly to deposit formation. These deposits reduce heat transfer effectiveness, plug gas passages, and can contribute to corrosion. A two-day shut down for cleaning can

result in over US dollar 500,000 in lost production in a medium sized mill. Recovery boilers built within the last five years, designed specifically to minimize carry-over deposit problems, still experience significant deposition and plugging because of fume deposits. It is therefore fruitful to understand the physical and chemical phenomena in fume particle formation, growth, transport, and deposition if problems with fume deposits are to be controlled or eliminated In pursuit of these goals, a laminar entrained flow reactor (LEFR) has been constructed at the Oregon State University Department of Chemical Engineering. The first experiments with the LEFR were performed in conjunction with the VTT Aerosol Technology Group (ATG) of Finland. The VTT/ATG used a Berner low pressure impactor (BLPI) to carry out size distribution measurements on black liquor (fuel) aerosols resulting from pyrolyzing and combustion conditions. An overview of the LEFR, the BLPI experimental set-up, and the experimental results. Entrained flow reactors have been used for a wide variety of research applications. As of this writing, the authors are aware of no research involving the use of a entrained flow reactor for the study of kraft black liquor.

7546 (GKSS–94/E/31) **Polymer membranes for methane gas treatment.** Bellingen, E.M. Hannover Univ. (Germany). Fakultaet fuer Maschinenwesen; GKSS-Forschungszentrum Geesthacht GmbH (Germany). Inst. fuer Chemie. 1994. 178p. (In German). Order Number DE95738116. Source: OSTI; NTIS (US Sales Only).

Natural- and landfill gases are mainly mixtures of methane, carbon-dioxide and hydrogen-sulfide. In the presence of water the acidic gas components cause corrosion in pipes and installations. Combustion without any separation facilities leads to SO_2-emissions which cause environmental problems. In this thesis different polymer membranes for gas sweetening have been investigated. In order to determine the specific separation properties, investigations with pure gases and gas mixtures were carried out. In order to determine the separation properties under working conditions, test runs were conducted at pressures at up to 70 bar and at temperatures from 5 to 55 C. The results evince a significant influence of the process parameters on the separation process and slow the conception of mathematical model for the determination of the separation properties. These results facilitate the comparison of different membrane systems for various applications and subsequently the best choice of separation process. (orig.)

7547 (KTM/E-B–155) **JALO - Fuel conversion. Final report on the energy research programme 1988-1992.** Sipilae, K. Ministry of Trade and Industry, Helsinki (Finland). Energy Dept. 1994. 112p. Project KTM-100/881/88. Order Number DE95737597. Source: OSTI; NTIS.

JALO Research Programme. Published in Finnish as report KTM/E-B–154.

The Finnish research programme on fuel conversion, JALO, was concerned with thermo-chemical conversion of spent pulping liquors, peat, wood, and industrial residues. The aim of the programme was to develop innovative power plants based on integrated gasification combined-cycle (IGCC). The research activity was carried out within 13 projects and focused, in particular, on fundamentals of thermochemical conversion technologies as well as on laboratory and pilot tests. In addition, development work was carried out within 20 industrial joint-development projects. Experimental and theoretical know-how concerning the new processes was increased significantly and the knowledge was applied in experiments on pressurised gasification pilot rigs. Industrial pilot or demonstration plants are being operated or constructed by Kemira Corporation, A. Ahlstrom Corporation, Imatran Voima Oy and Tampella Power Ltd, and industrial-scale plants are being planned by A. Ahlstrom Corporation, Tampella Power Ltd and Neste Oy. The pressurised test rigs of both the companies and the research institutes are among the first ones of their kind in the world. International research co-operation has been very active within the frameworks of IEA, EU-JOULE and the Nordic Council of Ministers. The next phase of the national energy technology programmes of Ministry of Trade and Industry started from the beginning of 1993 and is scheduled to continue until the end of 1998. Biomass conversion research will be done within BIOENERGY-programme and gasification research within LIEKKI2-programme.

7548 (NEI-DK–1804) **Shaft furnace gasification with regard to cogeneration. Partial report no. 1: Catalytic cracking of tar in synthesis gas. Bench-scale tests with hydro cracking catalysts.** Energiministeriets Forskningsprogram. Anvendelse af biomass til energiformaal. Pedersen, K. Jysk Teknologisk, Aarhus (Denmark). Nov 1989. 41p. (In Danish). Contract EM-1383/88-3. Order Number DE95737585. Source: OSTI; NTIS.

EFP-88.

The purpose of the gas cleaning project is to define the necessary parameters in order to implement decentral, straw-fueled combined heat/power plants with gas cleaning, based on tar cracking.Four catalyst systems for tar decomposition into gaseous components have been tested according to a new gas cleaning method. The catalysts have been tested in temperature interval 350 - 600 deg.C. The cleaning process was carried out under atmospheric pressure. The composition of gas to be cleaned simulated the typical gasification product of straw/air mixture: 12 % hydrogen, 12% carbon oxide, 16 % carbon dioxide, 20 % water vapor, 40 % nitrogen, and 0.03 % hydrogen sulfide. Phenol was added to water in concentration corresponding to 10 g/Nm^3 wet synthesis gas, as this tar component is the most difficult to convert. The catalysts tested were: nickel-molybdenum on alumina, nickel-tungsten on alumina, nickel-tungsten on silica-alumina and palladium on alumina support. Characteristics of these catalysts in form of graphs and numerical values are given. (EG)

7549 (NEI-DK–1806) **Shaft furnace gasification with regard to cogeneration of heat and power. Partial report no. 2: Gasification of straw - test 1-5.** Energiministeriets Forskningsprogram. Anvendelse af biomasse til energiformaal. Zielke, U. Texas Univ., Dallas, TX (United States). Richardson Center for Advanced Studies. Mar 1991. 134p. (In Danish). Contract EM-1383/88-3. Order Number DE95737586. Source: OSTI; NTIS.

EFP-88.

The purpose is to establish an experimental plant in order to modify gasification technology to be used for straw fuel. Low energy gas should be generated to be utilized in an engine. The project is divided into three stages: gasification in shaft- and whole-bale gasifier, gas cleaning and engine operation. This report describes the results of the first tests with a shaft gasifier. In these first 5 tests 42 tons straw were used, the collected operation time was 400 h. There were serious problems with straw-feeding mechanism, resulting in poor quality gas. The gas generator had too low temperature, resulting in frequent coke formation. The maximum calorific value observed was about 7 MJ/m^3. Stirring and improved straw feeding continuity were recommended. (EG)

7550 (NEI-DK–1807) **Shaft furnace gasification with regard to cogeneration of heat and power. Partial report no 5 - Final report. Gasification of wood chips - test 8-9. Gasification of straw - test 10-14.** Energiministeriets Forskningsprogram. Anvendelse af biomasse til energiformaal. Zielke, U. Dansk Teknologisk Inst., Aarhus (Denmark). Miljoeteknik; Voelund R og D Center, Kolding (Denmark). Jun 1994. 62p. (In Danish). Contract EM-1383/88-3. Order Number DE95737588. Source: OSTI; NTIS.

EFP-88.

The original project encompassed shaft furnace gasification of straw, gas cleaning by means of cracking and gas washing, and gas utilization as engine fuel. Additionally experiments with wood chip gasification have been performed. In the straw gasification process a noticeable trend to combustion in the gasifier peripheric region is observed ('Ringfeuer'). Gasification of wood chips is less complicated. The porous structure of the chips provides better transfer of gas and heat, and thereby makes chemical reactions easier. Positive experience with wood chips resulted in establishment of the Voelund gasification plant at Harbooere. The conclusion of the entire project (volumes 1 - 5) is that straw is a difficult material for gasification purposes. However, the process can prove viable and competitive with a specially designed stirrer and an improved air supply, to form a fine-grained and compact pyrolytic layer. (EG)

7551 (NEI-DK–1808) **Shaft furnace gasification with a view to to cogeneration of heat and power. Partial report no 4: Straw gasification - tests 6-7: gas washing.** Energiministeriets Forskningsprogram. Anvendelse af biomasse til energiformaal.

Zielke, U. Dansk Teknologisk Inst., Aarhus (Denmark). Miljoeteknik; Voelund R og D Center, Kolding (Denmark). Jul 1992. 64p. (In Danish). Contract EM-1383/88-3. Order Number DE95737587. Source: OSTI; NTIS.

Gas produced by thermal conversion of solid fuels always contains some impurities which can be removed by means of washing. The Kyndby combined heat/power plant uses straw as one of possible fuels and tar originating from straw gasification is experimentally removed by means of washing in a two-step gas scrubber. Test no 6 (5 hours altogether) consisted in gas washing under varying pressure. Test no 7 (15 hours altogether) was divided into two periods with gas scrubber cleaning in between. The unsatisfactory results are probably due to clogging of the cooling systems. The degree of gas cooling after passing the cleaning scrubbers is essential for the efficient use of the gas as engine fuel. (EG)

7552 (NREL/TP–421-7577) **Methane recovery from animal manures: A current opportunities casebook.** Lusk, P. (Resource Development Associates, Marietta, GA (United States)). National Renewable Energy Lab., Golden, CO (United States); Resource Development Associates, Marietta, GA (United States). Dec 1994. 101p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC36-83CH10093. Order Number DE95004003. Source: OSTI; NTIS; GPO Dep.

One manure management system provides not only pollution prevention but also converts a manure management problem into a new profit center. Economic evaluations and case studies of operating systems indicate that the anaerobic digestion of livestock manures is a commercially-available bioconversion technology with considerable potential for providing profitable co-products including a cost-effective renewable fuel for livestock production operations. This Casebook examines some of the current opportunities for the recovery of methane from the anaerobic digestion of animal manures. The economic evaluations are based on engineering studies of digesters that generate electricity from the recovered methane. Regression models, which can be used to estimate digester cost and internal rate of return, are developed from the evaluations. Finally, anaerobic digestion has considerable potential beyond agribusiness. Examples of digesters currently employed by other industries are provided.

0910 Properties and Composition

Refer also to citation(s) 7548

7553 (NEI-DK–1797) **Analysis of straw and straw ashes. Part 1. Recommended methods for basic parameters.** Westborg, S.; Nielsen, C. (eds.). Dk-Teknik, Soeborg (Denmark). Sep 1994. 18p. Contract ENS-1323/91-0015. Order Number DE95737564. Source: OSTI; NTIS.

EFP-91.

In the activity 'Utilization of Straw and Similar Agricultural Residues', which is an activity organized under the IEA Bioenergy Agreement, Task X, it was agreed that there is an urgent need for an international harmonization of analytical methods suitable for a general description of straw and straw ash in relation to energy utilization. As a support for the work in the activity, a Round Robin including the most commonly used parameters for straw and straw ash was carried out. The result of this Round Robin combined with the existing experience in the participating countries is the basis for the recommendations in part 1 of this document. At the present state, the recommendations are given for suitable methods in principle, not as detailed prescriptions. In the long view it is, however, the intention, that the recommendations should result in international standards. In the meantime it is expected that comments to the recommendations will be received, and hereby crating a wider basis for working out standard methods in detail. During the work it was recognized that used methods for some of the commonly analysed parameters need a further investigation before it can be decided, whether the methods are suitable for the characterization of biomass for energy utilization. These parameters are discussed in part 2. Furthermore, it was recognized that there is a need for other and more specialized methods for description of problems related to the utilization, such as reactivity, slagging/fouling, and corrosion. In part 3 there is a view over reported alternative methods for the characterization of straw and straw ashes, and in part 4 is listed both finished and on going research and development concerning analysis and characterization of biomass for energy utilization in the participating IEA countries. The present part is part 1. Recommended methods for basic parameters. (EG)

7554 (NEI-DK–1798) **Analysis of straw and straw ashes. Part 2. Basic parameters which demands further investigation of suitable analytical methods.** Westborg, S.; Nielsen, C. (eds.). Dk-Teknik, Soeborg (Denmark). Sep 1994. 13p. Contract ENS-1323/91-0015. Order Number DE95737565. Source: OSTI; NTIS.

EFP-91.

In the activity 'Utilization of Straw and Similar Agricultural Residues', which is an activity organized under the IEA Bioenergy Agreement, Task X, it was agreed that there is an urgent need for an international harmonization of analytical methods suitable for a general description of straw and straw ash in relation to energy utilization. As a support for the work in the activity, a Round Robin including the most commonly used parameters for straw and straw ash was carried out. The result of this Round Robin combined with the existing experience in the participating countries is the basis for the recommendations in part 1 of this document. At the present state, the recommendations are given for suitable methods in principle, not as detailed prescriptions. In the long view it is, however, the intention, that the recommendations should result in international standards. In the meantime it is expected that comments to the recommendations will be received, and hereby creating a wider basis for working out standard methods in detail. During the work it was recognized that used methods for some of the commonly analysed parameters need a further investigation before it can be decided, whether the methods are suitable for the characterization of biomass for energy utilization. There parameters are discussed in part 2. Furthermore, it was recognized that there is a need for other and more specialized methods for description of problems related to the utilization, such as reactivity, slagging/fouling, and corrosion. In part 3 there is a view over reported alternative methods for the characterization of straw and straw ashes, and in part 4 is listed both finished and on going research and development concerning analysis and characterization of biomass for energy utilization in the participating IEA countries. The present part is part 2. Basic parameters which demand further investigation of suitable analytical methods. (EG)

7555 (NEI-DK–1799) **Analysis of straw and straw ashes. Part 3. Alternative characterization methods.** Westborg, S.; Nielsen, C. (eds.). Dk-Teknik, Soeborg (Denmark). Sep 1994. 12p. Contract ENS-1323/91-0015. Order Number DE95737566. Source: OSTI; NTIS.

EFP-91.

In the activity 'Utilization of Straw and Similar Agricultural Residues', which is an activity organized under the IEA Bioenergy Agreement, Task X, it was agreed that there is an urgent need for an international harmonization of analytical methods suitable for a general description of straw and straw ash in relation to energy utilization. As a support for the work in the activity, a Round Robin including the most commonly used parameters for straw and straw ash was carried out. The result of this Round Robin combined with the existing experience in the participating countries is the basis for the recommendations in part 1 of this document. At the present state, the recommendations are given for suitable methods in principle, not as detailed prescriptions. In the long view it is, however, the intention, that the recommendations should result in international standards. In the meantime it is expected that comments to the recommendations will be received, and hereby creating a wider basis for working out standard methods in detail. During the work it was recognized that used methods for some of the commonly analysed parameters need a further investigation before it can be decide, whether the methods are suitable for the characterization of biomass for energy utilization. These parameters are discussed in part 2. Furthermore, it was recognized that there is a need for other and more specialized methods for description of problems related to the utilization, such as reactivity, slagging/fouling, and corrosion. In part 3 there is a view over reported alternative methods for the characterization of straw and straw ashes, and in part 4

is listed both finished and on going research and development concerning analysis and characterization of biomass for energy utilization in the participating IEA countries. The present part is part 3. Alternative characterization methods. (EG)

7556 (NEI-DK–1800) **Analysis of straw and straw ashes. Part 4. Research and development countries concerning analysis and characterization of biomass fuels. State of the art.** Westborg, S.; Nielsen, C. (eds.). Dk-Teknik, Soeborg (Denmark). Sep 1994. 16p. Contract ENS-1323/91-0015. Order Number DE95737567. Source: OSTI; NTIS.

EFP-91.

In the activity 'Utilization of Straw and Similar Agricultural Residues', which is an activity organized under the IEA Bioenergy Agreement, Task X, it was agreed that there is an urgent need for an international harmonization of analytical methods suitable for a general description of straw and straw ash in relation to energy utilization. As a support for the work in the activity, a Round Robin including the most commonly used parameters for straw and straw ash was carried out. The result of this Round Robin combined with the existing experience in the participating countries is the basis for the recommendations in part 1 of this document. At the present state, the recommendations are given for suitable methods in principle, not as detailed prescriptions. In the long view it is, however, the intention, that the recommendations should result in international standards. In the meantime it is expected that comments to the recommendations will be received, and hereby creating a wider basis for working out standard methods in detail. During the work it was recognized that used methods for some of the commonly analyzed parameters need a further investigation before it can be decided, whether the methods are suitable for the characterization of biomass for energy utilization. These parameters are discussed in part 2. Furthermore, it was recognized that there is a need for other and more specialized methods for description of problems related to the utilization, such as reactivity, slagging/fouling, and corrosion. In part 3 there is a view over reported alternative methods for the characterization of straw and straw ashes, and in part 4 there is listed both finished and on going research and development concerning analysis and characterization of biomass for energy utilization in the participating IEA countries. The present part is part 4. Research and development in the IEA countries concerning analysis and characterization of biomass fuels. State of the art. (EG)

7557 (NEI-DK–1801) **Analysis of straw and straw ashes. Compilation of comments received. Part 1-4.** Westborg, S.; Nielsen, C. (eds.). Dk-Teknik, Soeborg (Denmark). Sep 1994. 23p. Contract ENS-1323/91-0015. Order Number DE95737568. Source: OSTI; NTIS.

EFP-91.

The document 'Analysis of Straw and Straw ashes', part 1-4, September 1994 has been prepared for the IEA - Biomass Utilization Task X. The work has been financed through the Danish Energy Research programme via the project 'International Harmonization of Analytical Methods in the Field of Straw', Energy Research project no. 1323/91-0015. The first draft of the document, of April 1994, was distributed to the countries participating in the activity (Austria, Denmark, The Netherlands, Sweden, and United Kingdom) for comments. On the basis of the received comments, the document has been revised to the final edition of September 1994. The received comments contain several interesting information and points of view, which can be useful for the future work of establishing analytical methods for the characterization of straw and straw ashes. Therefore, it has been decided to work out this compilation of the received comments for a distribution to the participants in the work. To most of the received comments, editorial remarks are given. (au)

7558 (RISO-R–786(DA)) **Interview and literature study of combustion and deposition characteristics of straw.** Jensen, P.A. (Forskningscenter Risoe (Denmark)); Haahr Joergensen, K.; Stenholm, M. Risoe National Lab., Roskilde (Denmark). Combustion Dept.; Dk-Teknik, Soeborg (Denmark). Dec 1994. 39p. (In Danish). Contract ENS-1323/93-0015. Order Number DE95737594. Source: OSTI; NTIS; Also available from Risoe Library, P.O. Box 49, DK-4000 Roskilde, Denmark.

EFP-93.

In Denmark, straw is applied as a fuel at district heating and combined power and heat generating boiler plants. Straw is by no means a trivial fuel to burn, some of the problems have appeared at boiler plants as high CO-emissions, poor burnout and deposition on the boiler walls. Here a literature study has been conducted, reviewing the combustion and deposition properties of straw. Also a series of interviews have been performed at straw firing plants. The focus of the study has been to investigate, which straw fuel characteristics that may be applied for predicting the combustion and deposition properties of straws. The present investigation will be supplemented with combustion experiments at boiler plants. (au) (9 tabs., 5 ills., 44 refs.)

0920 Combustion

Refer also to citation(s) 7179, 7541, 7545, 7558

7559 (FAAR–23/1993, pp. 75-80) **Aerosols in black liquor combustion.** Mikkanen, P. (Technical Research Centre of Finland, Espoo (Finland). Aerosol Technology Group); Kauppinen, E.I.; Jokiniemi, J.K. Finnish Association for Aerosol Research, Espoo (Finland). 1993. (CONF-9306401–: 5. Finnish national aerosol symposium, Espoo (Finland), 1-3 Jun 1993). In *Report series in aerosol science.* 292p. Order Number DE95737628. Source: OSTI; NTIS.

Aerosol formation mechanism were studied by carrying out aerosol characterisation experiments at a real scale black liquor recovery boiler. The field measurements were carried out in June and November 1992 during intensive experimental periods. During experiments June 1992 black liquor originated from softwood and during experiments November 1992 from softwood and hardwood, respectively.

7560 (SAND–94-8780) **Baseline NO_x emissions during combustion of wood-derived pyrolysis oils.** Baxter, L.; Jenkins, B.; Winter, F. Sandia National Labs., Livermore, CA (United States). Jan 1995. 17p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. (CONF-9409224–1: Biomass pyrolysis oil properties and combustion meeting, Estes Park, CO (United States), 26-28 Sep 1994). Order Number DE95006198. Source: OSTI; NTIS; GPO Dep.

NO_x emissions from two pyrolysis oils of similar origin and overall composition but differing nitrogen contents (0.12 and 0.32% of dry fuel) are determined in a pilot-scale combustor. No NO_x reduction technology is employed in these tests, establishing the baseline or uncontrolled levels of NO_x. Measured effluent oxygen concentrations range from near 0% to near 21%, with stoichiometric ratios ranging from 0 to 1. NO and NO_x are measured separately and found to differ by insignificant (≈10–25 ppmv) amounts. Other relevant gas species (CO_2, CO, total hydrocarbons, and O_2) are also reported. Peak NO_x emissions from these fuels vary from about 300 to around 650 ppmv, with lower levels associated with low nitrogen content fuels. Trends with stoichiometric ratio and fuel nitrogen content agree qualitatively with behavior from other nitrogen containing fuels, including biomass, coal, and petroleum oils. Nitrogen conversion efficiencies as a function of stoichiometric and fuel nitrogen content are observed to decrease with increasing fuel nitrogen content and increase with increasing oxygen content. Measurements of thermal, prompt, and fuel NO_x contributes indicate that fuel NO_x is the dominant formation mechanism for these fuels. These data suggest that NO_x formed during combustion of pyrolysis oil lends itself to many of the same control technologies as are used in other nitrogen-containing fuel.

0930 Economic, Industrial, and Business Aspects

7561 (NUTEK-R–94-44) **Market conditions for wind power and biofuel-based cogeneration.** Swedish National Board for Industrial and Technical Development (NUTEK), Stockholm (Sweden). Jul 1994. 34p. (In Swedish). Order Number DE95616205. Source: OSTI; NTIS; INIS.

Prepared by Tentum AB for NUTEK.

The aim of this study is to analyze the prerequisites for biofuel-based cogeneration plants and for wind power, with special emphasis on following factors: 1/The effect on the Swedish energy market of the opening of the power transmission networks for free

competition within the electric power supply sector. 2/A market model for the connection between the prices on fossil fuels, biomass fuels, electric power, and heating on the Swedish market. The analysis is made for three scenarios concerning carbon dioxide/energy taxation and the oil price development. The three scenarios are: A. Constant prices on heating oil and coal., B. An internationally uniform carbon dioxide tax, which successively is raised to SEK 0.40 per kilo carbon dioxide to the year 2010. In the year 2005 this will correspond to a doubling of the present prices on crude oil., C. An unilateral Swedish energy- and carbon dioxide tax of todays model (without exception for electric power generation), with constant import prices on heating oil and coal. The decisive factors for bio-cogeneration are construction- and operation costs, the costs of biofuels, and the sales price on electric power and heat. For wind power it is the construction- and operation costs that settle the conditions. 18 figs, 6 tabs.

0950 Environmental Aspects

Refer also to citation(s) 8517

0980 Waste Management

Refer also to citation(s) 7560

7562 (RVF-R–94-7) **Optimization of biogas recovery by controlled deposition of solid waste. Status report 4.** Nilsson, Peter; Bramryd, T.; Aakesson, M. Svenska Renhaallningsverksforeningen, Malmoe (Sweden). 1994. 76p. (In Swedish). Order Number DE95737669. Source: OSTI; NTIS.

The study is conducted on six identical test cells roughly of 8000 m^3 each, where the input solid waste is the main varying parameter. The project is planned to run for another three years. The monitoring programme concerns the solid waste in the cells, the biogas and the leachate (quality and quantity). The report presents numbers and graphs over the development of biogas and leachate during the whole period from start up, with emphasis on the last years result. The overall conclusion so far is that we still after five years have a low leachate production (average 72 mm/y), and a high annual biogas production (average 11 m^3 methane gas per tons of dry matter). An increase in the annual leachate production over the last two years was observed. The leachate is rich in organic matter (BOD and COD) and nitrogen. The concentration of heavy metals is generally low. A pronounced seasonal variation in leachate production and quality was observed. The solid waste samples still show relatively high concentrations of VFA. 15 refs, 39 figs and 4 tabs

0990 Products and By-Products

Refer also to citation(s) 7155

10 SYNTHETIC FUELS

1002 Production

Refer also to citation(s) 7248, 7548, 8182

7563 (DOE/PC/90042–T10) **Development of a catalyst for conversion of syngas-derived materials to isobutylene. Quarterly report number 11, October 1–December 31, 1993.** Barger, P.T. UOP, Inc., Des Plaines, IL (United States). [1993]. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-91PC90042. Order Number DE95005185. Source: OSTI; NTIS; GPO Dep.

The goals of this project are to develop a catalyst and process for the conversion of syngas to isobutanol. The research will identify and optimize key catalyst and process characteristics. In addition, the commercial potential of the new process will be evaluated by an economic analysis. This report covers three phases of catalyst screening to identify a new catalyst for the production of isoalcohols from syngas or syngas-derived feeds. These phases involve a shift in the project strategy from the direct conversion of CO/H_2 to isoalcohols to a focus on catalysts for the conversion of methanol and, eventually, methanol/ethanol mixtures to higher branched alcohols. The testing of methanol synthesis based catalysts for the conversion of syngas to higher alcohols has been completed this quarter. The three additional catalysts that have been tested (cs modified Cu/Zn/Al oxide, Zn/Cr oxide and Pd/K on Zr/Zn/Mn oxide) have not afforded better selectivity or productivity to isoalcohols than previously tested materials. Considering the low activity that is generally observed for higher alcohols synthesis from syngas suggests that a two stage process combining conventional methanol synthesis with a new process to convert methanol to higher alcohols may be a superior approach to direct synthesis. Therefore, the focus of the research effort at UOP has shifted to the identification of catalysts for the conversion of methanol to higher branched alcohols, particularly isobutanol. A series of mixed metal oxide catalysts based on either conventional methanol synthesis catalysts, the Zr/Zn/Mn oxide catalysts or Mg/Al metal oxide solid solutions (MOSSs) have been evaluated for the conversion of methanol to higher alcohols.

7564 (DOE/PC/90044–10) **High octane ethers from synthesis gas-derived alcohols. Quarterly technical progress report, January–March, 1993.** Klier, K.; Herman, R.G.; Johansson, M.A.; Feeley, O.C. Lehigh Univ., Bethlehem, PA (United States). Apr 1993. 21p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-90PC90044. Order Number DE95005303. Source: OSTI; NTIS; GPO Dep.

The objective of the proposed research is to synthesize high octane ethers, primarily methyl isobutyl ether (MIBE) and methyl tertiary butyl ether (MTBE), directly from $H_2/CO/CO_2$ coal-derived synthesis gas via alcohol mixtures that are rich in methanol and 2-methyl-1-propanol (isobutanol). Testing and characterization studies with the 1 wt% sulfate-modified zirconia catalyst that demonstrates high activity and selectivity for dehydration of isobutanol to isobutene from methanol/isobutanol mixtures were continued. It was demonstrated that the secondary isobutanol was dehydrated at a much faster rate than the primary linear alcohols. X-ray photoelectron spectroscopy (XPS) studies were carried out to probe the types of surface acidity on this catalyst. This was accomplished by adsorption of pyridine onto the catalyst and then obtaining the XPS spectrum in the N 1s binding energy region. It was found that both Lewis acid sites and Broensted acid sites were present on the surface of this catalyst, and that most of the acid sites were Broensted acids in character. Similar XPS analyses with γ-alumina after adsorption of pyridine showed the presence of only Lewis acid sites. With the Nafion-H catalyst, which is a sulfonated fluorocarbon resin, the acid sites were of the Broensted acid type. In addition, some physically sorbed pyridine was observed on this sample since it had not been thermally evacuated as the sulfate-modified zirconia catalyst had been.

7565 (DOE/PC/90046–T10) **Heterogeneous catalytic process for alcohol fuels from syngas. Ninth quarterly technical progress report, January 1994–March 1994.** Union Carbide Chemicals and Plastics Co., Inc., South Charleston, WV (United States). [1995]. 20p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-91PC90046. Order Number DE95005558. Source: OSTI; NTIS; GPO Dep.

The principal objectives of this project are to discover and evaluate novel heterogeneous catalysts for conversion of syngas to oxygenates having use as fuel enhancers, to explore novel reactor and process concepts applicable in this process, and to develop the best total process for converting syngas to liquid fuels. The current targets for isobutanol-producing catalysts are to produce an equimolar mixture of methanol and isobutanol with a productivity for isobutanol of > 50 g/Kg-hr. The authors have continued to test their most promising isoalcohol catalyst (a promoted Zn/Cr/Mn spinel oxide). Using temperature and space velocity traverses, they have looked at the effect of conversion on catalyst performance.

7566 (DOE/PC/90046–T11) **Heterogeneous catalytic process for alcohol fuels from syngas. Tenth quarterly technical progress report, April 1994–June 1994.** Union Carbide Corp., South Charleston, WV (United States). [1995]. 10p. Sponsored by

USDOE, Washington, DC (United States). DOE Contract AC22-91PC90046. Order Number DE95005559. Source: OSTI; NTIS; GPO Dep.

The principal objectives of this project are to discover and evaluate novel heterogeneous catalysts for conversion of syngas to oxygenates having use as fuel enhancers, to explore novel reactor and process concepts applicable in this process, and to develop the best total process for converting syngas to liquid fuels. The current targets for isobutanol-producing catalysts are to produce an equimolar mixture of methanol and isobutanol with a productivity for isobutanol of > 50 g/Kg-hr. The authors have tested one of our most promising isoalcohol catalysts (10-DAN-55, Pd on $ZnCr_2O_4$) at pressures up to 1500 psi and temperatures from 400°C to 450°C at GHSV=6000 and syngas ratio = 1:2.

7567 (DOE/PC/92532–T9) **Fischer-Tropsch synthesis in supercritical reaction media. Quarterly progress report, July 1–September 31, 1994.** Subramaniam, B.; Bochniak, D.; Snavely, K. Kansas Univ., Lawrence, KS (United States). Dept. of Chemical and Petroleum Engineering. Oct 1994. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-92PC92532. Order Number DE95005186. Source: OSTI; NTIS; GPO Dep.

The authors commenced investigations of FT reactions with near-critical n-hexane as the reaction medium. Further work was performed on catalyst characterization, including testing a catalyst that has been merely pretreated and catalyst which has also been used in reaction. Successful on-line analysis of FT products in the range was made using the Petrocol DH capillary column. Several analytical problems had to be solved prior to this step however. These problems and their resolutions are described. Preliminary results are included with this report.

7568 (DOE/PC/93213–T4) **Rate inhibition of steam gasification by adsorbed hydrogen. Quarterly technical progress report, July 1–September 30, 1994.** Miller, D.J. Michigan State Univ., East Lansing, MI (United States). [1994]. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-93PC93213. Order Number DE95005188. Source: OSTI; NTIS; GPO Dep.

Progress has been made on several fronts during the fourth quarter of the grant: exhaustive calibration of the gas analysis system, quantitative outgassing experiments, hydrogasification and steam gasification experiments, and ^{1}H-NMR analysis of prepared and annealed carbons have all been completed. Overall, the project has progressed over the past three months from the initial set-up and testing phase to the core experimental phase. The authors have conducted several hydrogen and steam gasification experiments on both as-prepared and annealed Saran char. Production of CO_2 and $CH4_4$ are evident but at a significantly lower rate than CO and H_2. The H_2 formation rate is somewhat higher than the CO formation rate, partially because some carbon is converted to CO_2 or CH_4. But also possibly from the shift reaction or of an inconsistency in calibration.

7569 (KE–93016G) **Study on the production of alternative fuels by carbon dioxide hydrogenation (I).** Sim, K.S. (Korea Institute of Energy Research, Taejon (Korea, Republic of)); Son, Y.M.; Kim, J.W.; Kim, Y.S.; Myong, K.S.; Seo, J.M. No corporate text available. Dec 1993. 89p. (In Korean). Order Number DE95744284. Source: OSTI; NTIS (US Sales Only).

The technologies of the separation and recovery of carbon dioxide from exhausted gases which is the most important greenhouse gas, of the fuel production from carbon dioxide by catalytic hydrogenation were surveyed. For the catalytic hydrogenation we made the lab-scale reaction apparatus and carried out some basic experiments with several catalysts like CuO/ZnO/Al203, Raney nickel and other commercial catalysts. (author). refs., figs., tabs.

7570 (ORNL/TM–12849) **Bioprocessing in nonaqueous media - critical needs and opportunities.** Scott, C.D. (Oak Ridge National Lab., TN (United States)); Scott, T.C.; Blanch, H.W.; Klibanov, A.M.; Russell, A.J. Oak Ridge National Lab., TN (United States). Jan 1995. 41p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE95004878. Source: OSTI; NTIS; GPO Dep.

Chemical conversion processes are pervasive in the U.S. industry. Whether they are used to make intermediate or final products or to remove hazardous materials from process waste streams, they are critical elements in the processing industries. Because of the mild reaction conditions, unique specificity, and selectivity, advanced processing concepts utilizing biocatalytic conversions are now being considered for many industrial uses, including those directly related to energy production and efficiency. Almost all bioprocessing systems currently used by industry utilize the biocatalysts (microorganisms or extracted enzymes) in a "natural" aqueous environment. This has resulted in many important large-scale applications, particularly in the fermentation and pharmaceutical industries. An exciting new area of bioprocessing research is now evolving - the use of biocatalysts in contact with nonaqueous media such as organic liquids or gases, or supercritical fluids. Such approaches could result in additional bioprocessing concepts that would result in a much broader range of utility, especially in energy production and energy-efficient conversion processes in the chemical industry. In fact, a whole new industry may be evolving.

7571 (PNL-SA–24417) **A simulated countercurrent moving-bed chromatographic reactor for the oxidative coupling of methane: Experimental results.** Tonkovich, A.L.Y. (Pacific Northwest Lab., Richland, WA (United States)); Carr, R.W. Pacific Northwest Lab., Richland, WA (United States). Sep 1994. 21p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-940920–1: 13. international symposium on chemical reaction engineering, Baltimore, MD (United States), 25 Sep 1994). Order Number DE95004556. Source: OSTI; NTIS; GPO Dep.

The oxidative coupling reaction of methane (OCM) represents a potential commercial ethylene production route. However, the highest reported yields do not exceed 20%. The methane coupling reaction is accompanied by the undesired conversion of methane to carbon oxides. The relative amount of oxygen and methane along with other parameters, including temperature, determine the favored reaction pathway. High hydrocarbon to oxygen feed ratios give high ethane/ethylene selectivities but at the expense of the hydrocarbon conversion. When the methane to oxygen feed ratio is low, combustion is favored. The simulated countercurrent moving-bed chromatographic reactor (SCMCR) is applied to the OCM. A modified experimental configuration is designed and evaluated. A four-section apparatus, each containing a reaction and two separation columns, is used to quickly separate the reactants and products using the principles of simulated countercurrent flow. Simultaneous reaction and separation of the reactive products column is desired, but unattainable because of an incompatibility between OCM reaction and separation temperatures. Microreactor yields with a samarium oxide catalyst gives yields between 2% and 10%. Yields as high as 50% are observed with the same catalyst and run conditions in the SCMCR. These yields are significantly higher than previously reported values. The effects of temperature, feed switching time, and methane to oxygen feed ratio have been investigated. The reactor, while not fully optimized, does give promise as an alternative production method for ethylene.

1020 Products and By-Products

7572 (KE–93019G) **Study of new technology of W/O emulsion for compression ignition diesel engine.** Kwon, C.H. (Korea Institute of Energy Research, Taejon (Korea, Republic of)); Kho, C.C.; Lee, Y.J.; Kim, J.P.; Kim, B.S.; Kwon, O.S. No corporate text available. Dec 1993. 137p. (In Korean). Order Number DE95743535. Source: OSTI; NTIS (US Sales Only).

To reduce the exhaust emission of diesel engine, new water-in-oil type emulsion technology was devised. Emulsion fuel was made by only ultrasonic wave (40kHz, 200W), and injected immediately to engine combustion chamber using specially designed apparatus. Surfactant was never used. The experiment results of emulsion fuel are very positive. Experimental engine is 4 cycle, single cylinder compression ignition diesel engine, and its output is 6.5kW. In the case of 30% of water content, specific fuel consumption was reduced by max. 28%, smoke by max. 60%, and CO emission by max. 79%. However, HC emission was getting more serious on the contrary. Micro explosion phenomenom of water-in-oil emulsified

fuel was attributed to a primary factor for the above mentioned positive effects.(author). Refs. and figs.

13 HYDRO ENERGY

Refer also to citation(s) 8221

1301 Resources and Availability

Refer also to citation(s) 7574

1306 Environmental Aspects

7573 (DOE/BP/01385–2) **Evaluation of juvenile fish bypass and adult fish passage facilities at water diversions in the Umatilla River. Annual and interim progress report, October 1990–September 1991.** Knapp, S.M. (ed.). Oregon Dept. of Fish and Wildlife, Portland, OR (United States). Jun 1992. 193p. Sponsored by USDOE, Washington, DC (United States). DOE Contract BI79-89BP01385. Order Number DE95004893. Source: OSTI; NTIS; GPO Dep.

We report on our effort from October 1990 through March 1991 to prepare for the evaluation of the juvenile fish bypass facility in the West Extension Irrigation District Canal at Three Mile Falls Dam on the Umatilla River. We also report on our preliminary activities to prepare for future evaluations at Maxwell and Westland diversion dams. A detailed sampling plan was written to guide our efforts in the evaluation process and associated preparatory activities were conducted. In the sampling plan, we developed experimental designs for evaluating the passage of juvenile salmonids through the bypass system including the evaluation at design flow of injury and mortality rates, and passage of juvenile salmonids through and over the screens. We designed and fabricated fish nets for screen leakage tests, and holding facilities for test fish. Modifications to improve evaluation activities were incorporated into the collection facility, and our sampling gear. We designed and fabricated collection systems for the juvenile fish bypass facilities at Maxwell and Westland diversion dams. Preliminary monitoring of system operation was performed at Westland Diversion Dam. We offer recommendations for improving preparations and designs of future evaluations, and also recommend that a detailed evaluation of the Maxwell and Westland juvenile facilities, including evaluation of fish condition and fish passage through or over the screens, be conducted.

7574 (DOE/BP–1953) **Screening analysis, volume 1 description and conclusions, August 1992.** USDOE Bonneville Power Administration, Portland, OR (United States). Aug 1992. 230p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95004891. Source: OSTI; NTIS; GPO Dep.

The SOR consists of three analytical phases leading to a Draft EIS. The first phase Pilot Analysis, was performed for the purpose of testing the decision analysis methodology being used in the SOR. The Pilot Analysis is described later in this chapter. The second phase, Screening Analysis, examines all possible operating alternatives using a simplified analytical approach. It is described in detail in this and the next chapter. This document also presents the results of screening. The final phase, Full-Scale Analysis, will be documented in the Draft EIS and is intended to evaluate comprehensively the few, best alternatives arising from the screening analysis. The purpose of screening is to analyze a wide variety of differing ways of operating the Columbia River system to test the reaction of the system to change. The many alternatives considered reflect the range of needs and requirements of the various river users and interests in the Columbia River Basin. While some of the alternatives might be viewed as extreme, the information gained from the analysis is useful in highlighting issues and conflicts in meeting operating objectives. Screening is also intended to develop a broad technical basis for evaluation including regional experts and to begin developing an evaluation capability for each river use that will support full-scale analysis. Finally, screening provides a logical method for examining all possible options and reaching a decision on a few alternatives worthy of full-scale analysis. An organizational structure was developed and staffed to manage and execute the SOR, specifically during the screening phase and the upcoming full-scale analysis phase. The organization involves ten technical work groups, each representing a particular river use. Several other groups exist to oversee or support the efforts of the work groups.

7575 (DOE/BP/22493–8) **Kokanee stock status and contribution of Cabinet Gorge Hatchery, Lake Pend Oreille, Idaho. Final report.** Paragamian, V.L.; Ellis, V.L. Idaho Dept. of Fish and Game, Boise, ID (United States). Fisheries Research Section. Jul 1994. 77p. Sponsored by USDOE, Washington, DC (United States). DOE Contract BI79-85BP22493. Order Number DE95004885. Source: OSTI; NTIS; GPO Dep.

Lake Pend Oreille once provided the most popular kokanee Oncorhynchus nerka fishery in northern Idaho. A dramatic decline in the population occurred from the mid-1960s to 1970s. Restoration efforts included construction of the Cabinet Gorge Fish Hatchery to supplement the wild population and restore the fishery. In this study, hatchery-reared age 0 kokanee were stocked into Lake Pend Oreille from 1986 through 1992. Seven experimental stocking strategies for kokanee were tested using five locations and two time periods (early May through early June or late July). In 1985, the age 3 and older kokanee totaled about 0.35 million, but rose to 0.78 million in 1986, was stable, was then followed by a decline in 1990 to 0.53 million, then improved to 1.75 million in 1992. Much of the annual variation in total numbers of kokanee, ranging from 4.5 million to 10.2 million, was due to hatchery stockings of age 0 fish. Standing stocks of kokanee remained stable and ranged from 8 to 10 kg/hectare despite dramatic changes in density due to age 0 fish. Prior to this study (1985), standing stocks were substantially higher (mean = 13.6 kg/hectare), indicating that the population may be operating below carrying capacity. The authors found survival of age 0 hatchery kokanee by each release season to range from 3% in 1986 to 39% in 1992, while the mean from 1987 through 1992 was 23%. They found significant ($P=0.05$) differences in survival between years, but they could not detect differences between stocking locations ($P>0.71$). Their analysis of survival between time (early vs late) and location was weak and inconclusive because after 1989 they had fewer fish to stock and could not repeat testing of some release strategies. They believe some of the variation in survival between release groups each year was due to the length of time between release in the lake and trawling.

7576 (DOE/BP/23720–21) **Umatilla hatchery monitoring and evaluation. Annual report 1993, September 1, 1992–October 30, 1993.** Keefe, M.L.; Carmichael, R.W.; Focher, S.M.; Groberg, W.J.; Hayes, M.C. Oregon Dept. of Fish and Wildlife, Portland, OR (United States). Jun 1994. 112p. Sponsored by USDOE, Washington, DC (United States). DOE Contract BI79-91BP23720. Order Number DE95003115. Source: OSTI; NTIS; GPO Dep.

The Umatilla Hatchery is the foundation for rehabilitating chinook salmon and enhancing summer steelhead in the Umatilla River and expected to contribute significantly to the Northwest Power Planning Council's goal of doubling salmonid production in the Columbia Basin. This report covers the second year of comprehensive monitoring and evaluation of the Umatilla Hatchery. As both the hatchery and the evaluation study are in the early stages of implementation, much of the information contained in this report is preliminary.

7577 (DOE/BP/91964–3) **Significance of selective predation and development of prey protection measures for juvenile salmonids in the Columbia and Snake River Reservoirs. Annual report, February 1992–February 1993.** Poe, T.P.; Gadomski, D.M. Fish and Wildlife Service, Portland, OR (United States). Columbia River Field Station. Oct 1994. 127p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AI79-88BP91964. Order Number DE95004889. Source: OSTI; NTIS; GPO Dep.

This document is the 1992 annual report of progress for the Bonneville Power Administration (BPA) research Project No. 82-003 conducted by the U.S. Fish and Wildlife Service (FWS), the Oregon Cooperative Fishery Research Unit (OCFRU), and the Idaho Cooperative Fish and Wildlife Research Unit (ICFWRU). The

approach was to present the progress achieved during 1992 in a series of separate reports for each major project task. Each report is prepared in the format of a scientific paper and is able to stand alone, whatever the state of progress or completion. Reports 1, 2, and 4 consist of the Abstract only (journal papers were submitted in lieu of reports). This project has two major goals. One is to understand the significance of selective predation and prey vulnerability by determining if substandard juvenile salmonids (dead, injured, stressed, diseased, or naive) are more vulnerable to predation by northern squawfish, Ptychocheilus oregonensis, than standard or normal juvenile salmonids. The second goal is to develop and test prey protection measures to control predation on juvenile salmonids by reducing predator-smolt encounters or predator capture efficiency. Separate abstracts have been submitted to the database for the seven articles in this report.

7578 (DOE/BP/97298–2) **Movements of white sturgeon in Lake Roosevelt. Final report, 1988–1991.** Brannon, E.; Setter, A. Idaho Univ., Moscow, ID (United States). Aquaculture Inst. Jun 1992. 35p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95004884. Source: OSTI; NTIS; GPO Dep.

Historically, white sturgeon moved throughout the Columbia River system, ranging freely from the estuary to the headwaters, with the possible exception of limited passage at Cascades, Celilo and Kettle Falls during spring floods. Construction of Rock Island Dam in 1933, followed by Bonneville in 1938 and Grand Coulee in 1941, completely disrupted sturgeon migratory opportunity, and with the 17 successive Columbia and Snake river dams constructed over the next 32 years an entirely different river system was created for the species. Sturgeon caught between dams were essentially isolated populations with severely limited reproduction potential. Some reservoirs ran from dam to dam with no river habitat remaining, while other reaches had various lengths of free running river, but drastically reduced from historical situations. However, if reservoirs provide habitat for sturgeon use, and therefore compensate to some degree for river loss, the major limiting factors associated with population viability may be reduced spawning success, either from lack of suitable area or poor incubation environments. The most upstream impoundment of the Columbia River in the United States is Lake Roosevelt, behind Grand Coulee Dam. If sturgeon don't use Lake Roosevelt the capacity of the system to sustain a large sturgeon population would be understandably limited, and much reduced from the pre-dam era. In general this study found that sturgeon spawner aggregations from early spring to mid- summer depend most heavily on the timing of increasing water temperature. In the spring the water temperatures seem to stimulate the fish to start feeding and leave deep pools. The summer provides access to broader and shallower areas for food. The study on sturgeon movement was an attempt to define habitat use in such a reservoir/river system.

7579 (DOE/EA–0939) **Blue Creek Winter Range: Wildlife Mitigation Project. Final environmental assessment.** USDOE Bonneville Power Administration, Portland, OR (United States); Spokane Indian Tribe, Wellpinit, WA (United States); Bureau of Indian Affairs, Washington, DC (United States). Nov 1994. 59p. Sponsored by USDOE, Washington, DC (United States);Department of the Interior, Washington, DC (United States). (DOE/BP–2505). Order Number DE95004886. Source: OSTI; NTIS; INIS; GPO Dep.

Bonneville Power Administration (BPA) proposes to fund that portion of the Washington Wildlife Agreement pertaining to the Blue Creek Winter Range Wildlife Mitigation Project (Project) in a cooperative effort with the Spokane Tribe, Upper Columbia United Tribes, and the Bureau of Indian Affairs (BIA). If fully implemented, the proposed action would allow the sponsors to protect and enhance 2,631 habitat units of big game winter range and riparian shrub habitat on 2,185 hectares (5,400 acres) of Spokane Tribal trust lands, and to conduct long term wildlife management activities within the Spokane Indian Reservation project area. This Final Environmental Assessment (EA) examines the potential environmental effects of securing land and conducting wildlife habitat enhancement and long term management activities within the boundaries of the Spokane Indian Reservation. Four proposed activities (habitat protection, habitat enhancement, operation and maintenance, and monitoring and evaluation) are analyzed. The proposed action is intended to meet the need for mitigation of wildlife and wildlife habitat adversely affected by the construction of Grand Coulee Dam and its reservoir.

1308 Health and Safety

7580 (VYH-JULK–A167) **Investigation report of dam safety research in China. Report of hydraulic models.** Qian Mingsen; Wang Lianxiang; Zhang Dong; Yu Minmin; Shi Jun; Reiter, P.; Pyyny, J.; Rytkoenen, T.; Alanko, M. National Board of Waters and Environment, Helsinki (Finland). 1993. 92p. Order Number DE95700207. Source: OSTI; NTIS.

This publication consists of the first and second stages of the Chinese-Finnish Cooperative Research Work on Dam Break Hydrodynamics. It deals with the general situations of dam safety in China. The second part of this report focuses on studies of flow phenomena in dam breach opening.

7581 (VYH-JULK–A167, pp. 3-39) **Investigation report of dam safety research in China.** Qian Mingsen; Wang Lianxiang; Zhang Dong; Yu Minmin; Shi Jun; Reiter, P.; Pyyny, J.; Rytkoenen, T.; Alanko, M. National Board of Waters and Environment, Helsinki (Finland). 1993. In *Chinese-Finnish cooperative research work on dam break hydrodynamics.* 92p. Order Number DE95700207. Source: OSTI; NTIS.

This publication is the first stage report of the Chinese-Finnish Cooperative Research Work on Dam Break Hydrodynamics. It mainly deals with the general situations of dam safety and the experiences in dam break prevention in China. The report includes: 1. General status of reservoir and dam safety problems, 2. Model studies in situ on fuse plug dams, 3. Research on dam break hydrodynamics. The contents in the report might be used as background findings for the cooperation research work, especially for development of a mathematical dam break model, in which the dam break process including overtopping or piping is to be considered.

7582 (VYH-JULK–A167, pp. 41-89) **Chinese-Finnish cooperative research work on dam break hydrodynamics.** Shuibo, Pan; Loukola, E. (eds.); Qian Mingsen; Wang Lianxiang; Zhang Dong; Yu Minmin; Shi Jun; Reiter, P.; Pyyny, J.; Rytkoenen, T.; Alanko, M. National Board of Waters and Environment, Helsinki (Finland). 1993. In *Chinese-Finnish cooperative research work on dam break hydrodynamics.* 92p. Order Number DE95700207. Source: OSTI; NTIS.

This publication is the second stage report of the Chinese-Finnish Cooperative Research Work on Dam Break Hydrodynamics. It mainly focuses on studies of flow phenomena in a dam breach opening and aims at finding the time-average pressure distribution and pressure fluctuation on both the bottom and side surfaces in the dam breach opening, the velocity distribution on transversal cross sections in the breach opening as well as the effects of different upstream and downstream water levels on the above mentioned parameters.

14 SOLAR ENERGY

Refer also to citation(s) 8463

1405 Solar Energy Conversion

Refer also to citation(s) 7844, 8413

7583 (NREL/TP–411-7472) **Amorphous silicon photovoltaic manufacturing technology - Phase 2A. Annual subcontract report, May 1, 1993–April 30, 1994.** Duran, G. (Utility Power Group, Chatsworth, CA (United States)); Mackamul, K.; Metcalf, D. National Renewable Energy Lab., Golden, CO (United States). Jan 1995. 79p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC36-83CH10093. Order Number DE95000298. Source: OSTI; NTIS; GPO Dep.

Utility Power Group (UPG), and its lower-tier subcontractor, Advanced Photovoltaic Systems, Inc. (APS) have conducted efforts in

developing their manufacturing lines. UPG has focused on the automation of encapsulation and termination processes developed in Phase I. APS has focused on completion of the encapsulation and module design tasks, while continuing the process and quality control and automation projects. The goal is to produce 55 watt (stabilized) EP50 modules in a new facility. In the APS Trenton EUREKA manufacturing facility, APS has: (1) Developed high throughput lamination procedures; (2) Optimized existing module designs; (3) Developed new module designs for architectural applications; (4) Developed enhanced deposition parameter control; (5) Designed equipment required to manufacture new EUREKA modules developed during Phase II; (6) Improved uniformity of thin-film materials deposition; and (7) Improved the stabilized power output of the APS EP50 EUREKA module to 55 watts. In the APS Fairfield EUREKA manufacturing facility, APS has: (1) Introduced the new products developed under Phase I into the APS Fairfield EUREKA module production line; (2) Increased the extent of automation in the production line; (3) Introduced Statistical Process Control to the module production line; and (4) Transferred-progress made in the APS Trenton facility into the APS Fairfield facility.

7584 (NREL/TP–411-7473) **Automated solar cell assembly teamed process research. Semiannual subcontract report, December 6, 1993–June 30, 1994.** Nowlan, M. (Spire Corp., Bedford, MA (United States)). National Renewable Energy Lab., Golden, CO (United States). Jan 1995. 27p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC36-83CH10093. Order Number DE95000299. Source: OSTI; NTIS; GPO Dep.

This is the second Semiannual Technical Progress Report for the program titled 'Automated Solar Cell Assembly Teamed Process Research' funded under National Renewable Energy Laboratory (NREL) subcontract No. ZAG-3-11219-01. This report describes the work done on Phase II of the program in the period from December 6, 1993 to June 30, 1994. Spire's objective in this program is to develop high throughput (5 MW/yr) automated processes for interconnecting thin (200 μm) silicon solar cells. High yield will be achieved with these fragile cells through the development of low mechanical stress and low thermal stress processes. For example, a machine vision system is being developed for cell alignment without mechanically contacting the cell edges, while a new soldering process is being developed to solder metal interconnect ribbons simultaneously to a cells' front and back contacts, eliminating one of the two heating steps normally used for soldering each cell.

7585 (NREL/TP–433-7209) **Solar photochemistry - twenty years of progress, what's been accomplished, and where does it lead?.** Blake, D.M. National Renewable Energy Lab., Golden, CO (United States). Jan 1995. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC36-83CH10093. Order Number DE95004007. Source: OSTI; NTIS; GPO Dep.

It has been more than 20 years since the first oil embargo. That event created an awareness of the need for alternative sources of energy and renewed interest in combining sunlight and chemistry to produce the chemicals and materials required by industry. This paper will review approaches that have been taken, progress that has been made, and give some projections for the near and longer term prospects for commercialization of solar photochemistry.

7586 (NREL/TP–472-7023) **Renewable Energy Demonstration Project by the National Renewable Energy Laboratory and the General Services Administration.** Carlisle, N. (National Renewable Energy Lab., Golden, CO (United States)); Hoo, E.; Westby, R.; Hancock, E.; Lu, J. National Renewable Energy Lab., Golden, CO (United States). Nov 1994. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC36-83CH10093. (CONF-941218–2: 17. world energy engineering congress and the 4th environmental technology congress and expo, Atlanta, GA (United States), 7-9 Dec 1994). Order Number DE95000261. Source: OSTI; NTIS; GPO Dep.

The Energy Policy Act of 1992 (EPACT) requires the General Services Administration (GSA) to implement a solar energy program to demonstrate and evaluate the performance of available technologies expected to have widespread commercial application. The GSA decided to carry out the project at the Denver Federal Center because of its proximity to the National Renewable Energy Laboratory (NREL). The location was thought to be of mutual benefit to NREL and the GSA: it provides NREL an opportunity to deploy technology and it provides the GSA an opportunity to gain a hands-on learning experience with renewables. The GSA plans to document their experience and use it as a case study in part of a larger training effort on renewable energy. This paper describes the technology selection process and provides an update on the status of the project.

7587 (SAND–94-1546C) **Silicon surface and bulk defect passivation by low temperature PECVD oxides and nitrides.** Chen, Z. (Georgia Institute of Technology, Atlanta, GA (United States). Univ. Center of Excellence for Photovoltaics Research and Education); Rohatgi, A.; Ruby, D. Sandia National Labs., Albuquerque, NM (United States). [1995]. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. (CONF-941203–8: 1. world conference on photovoltaic energy conversion, Waikoloa, HI (United States), 5-9 Dec 1994). Order Number DE95004531. Source: OSTI; NTIS; GPO Dep.

The effectiveness of PECVD passivation of surface and bulk defects in Si, as well as phosphorous diffused emitters, Is investigated and quantified. Significant hydrogen incorporation coupled with high positive charge density in the PECVD SiN layer is found to play an important role in bulk and surface passivation. It is shown that photo-assisted anneal in a forming gas ambient after PECVD depositions significantly improves the passivation of emitter and bulk defects. PECVD passivation of phosphorous doped emitters and boron doped bare Si surfaces is found to be a strong function of doping concentration. Surface recombination velocity of less than 200 cm/s for 0.2 Ohm-cm and less than 1 cm/s for high resistivity substrates ($\sim$ Ohm-cm) were achieved. PECVD passivation improved bulk lifetime in the range of 30% to 70% in multicrystalline Si materials. However, the degree of the passivation was found to be highly material specific. Depending upon the passivation scheme, emitter saturation current density (J_{oe}) can be reduced by a factor of 3 to 9. Finally, the stability of PECVD oxide/nitride passivation under prolonged UV exposure is established.

7588 (SAND–94-1557C) **A statistical analysis of the effect of PECVD deposition parameters on surface and bulk recombination in silicon solar cells.** Ruby, D.S. (Sandia National Labs., Albuquerque, NM (United States)); Wilbanks, W.L.; Fleddermann, C.B. Sandia National Labs., Albuquerque, NM (United States). [1995]. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. (CONF-941203–16: 1. world conference on photovoltaic energy conversion, Waikoloa, HI (United States), 5-9 Dec 1994). Order Number DE95004780. Source: OSTI; NTIS; GPO Dep.

We have performed a statistically designed multiparameter experiment using response surface methodology to determine the optimum deposition and anneal conditions for PECVD silicon-oxide and silicon-nitride films on Si solar cells. Our process includes a unique in situ hydrogen plasma treatment to promote bulk defect passivation independently of surface effects. Our goal has been to define a process to optimize cell performance by minimizing recombination while also providing an effective antireflection coating. Our initial results show that excellent emitter-surface passivation, approaching that of the best thermally grown oxides, can be obtained using a single-layer nitride coating whose refractive index is optimized for antireflection purposes. Use of the PECVD-nitride instead of a TiO_2 ARC resulted in an 11% increase in output power.

7589 (SAND–94-1562C) **Crystalline-silicon photovoltaics: Necessary and sufficient.** Basore, P.A.; Gee, J.M. Sandia National Labs., Albuquerque, NM (United States). [1995]. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. (CONF-941203–9: 1. world conference on photovoltaic energy conversion, Waikoloa, HI (United States), 5-9 Dec 1994). Order Number DE95004540. Source: OSTI; NTIS; GPO Dep.

Photovoltaic (PV) energy systems have always been dominated by crystalline-silicon (c-Si) technology, and recent developments persuasively suggest that c-Si will continue to be the dominant technology well into the next century. The authors explain why c-Si technology is fairing much better than previously expected, and discuss the impact of improvements currently under development.

They use a ground-up, engineering-based approach to predict the expected evolution of this type of PV system, and argue that c-Si PV will be in a position to compete for the US residential power market starting in about the year 2010. This market alone will provide the opportunity for PV to supply several percent of the electrical energy used in the United States. Crystalline-silicon technology is therefore not just necessary for building a near-term PV industry; it also offers a low-risk approach to meeting long-term goals for PV energy systems.

7590 (SAND–94-1563C) **Extraction of the surface recombination velocity of passivated phosphorus-doped silicon emitters.** Cuevas, A. (Australian National Univ., Canberra, CT (United States). Faculty of Engineering); Giroult-Matlakowski, G.; DuBois, C.; Basore, P.A.; King, R.R. Sandia National Labs., Albuquerque, NM (United States). [1995]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. (CONF-941203–10: 1. world conference on photovoltaic energy conversion, Waikoloa, HI (United States), 5-9 Dec 1994). Order Number DE95004539. Source: OSTI; NTIS; GPO Dep.

An analytical procedure to extract the surface recombination velocity of the SiO_2/n type silicon interface, S_p, from PCD measurements of emitter recombination currents is described. The analysis shows that the extracted values of S_p are significantly affected by the assumed material parameters for highly doped silicon, t_p, μ_p and ΔE_g^{app}. Updated values for these parameters are used to obtain the dependence of S_p on the phosphorus concentration, N_D, using both previous and new experimental data. The new evidence supports the finding that S_p increases strongly with N_D.

7591 (SAND–94-1570C) **Reflectance control for multicrystalline-silicon photovoltaic modules using textured-dielectric coatings.** Gee, J.M. (Sandia National Labs., Albuquerque, NM (United States)); Tardy, H.L.; Hund, T.D.; Gordon, R.; Liang, H. Sandia National Labs., Albuquerque, NM (United States). [1995]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. (CONF-941203–1: 1. world conference on photovoltaic energy conversion, Waikoloa, HI (United States), 5-9 Dec 1994). Order Number DE95004532. Source: OSTI; NTIS; GPO Dep.

The authors describe a new approach for controlling the reflectance of photovoltaic modules with planar-surface solar cells. The new approach uses an optically thick, dielectric coating with a large refractive index and a textured surface; this dielectric coating is deposited on the planar-surface solar cell. The textured-dielectric coating works optically with the module encapsulation to promote optical confinement of rays inside the module encapsulation structure, which reduces the net reflectance of the photovoltaic module. The advantage of this approach is that deposition of a textured-dielectric film may be less costly and less intrusive on the cell manufacturing process than texturing multicrystalline-silicon substrates. The authors present detailed optical models and experimental confirmation of the new approach.

7592 (SAND–94-1571C) **The effect of encapsulation on the reflectance of photovoltaic modules using textured multicrystalline-silicon solar cells.** Gee, J.M. (Sandia National Labs., Albuquerque, NM (United States)); Schubert, W.K.; Tardy, H.L.; Hund, T.D.; Robison, G. Sandia National Labs., Albuquerque, NM (United States). [1995]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. (CONF-941203–15: 1. world conference on photovoltaic energy conversion, Waikoloa, HI (United States), 5-9 Dec 1994). Order Number DE95004781. Source: OSTI; NTIS; GPO Dep.

Texturing multicrystalline-silicon cells is a promising technique for reducing reflectance losses. We investigated two methods for texturing multicrystalline-silicon solar cells - anisotropic chemical etch and mechanical dicing saw. Our work emphasized reducing reflectance in the encapsulated module by using optical confinement in the module. We found that optical confinement in the module is very important in the optimization of texture geometries.

7593 (SAND–94-1597C) **GaAsSb-based heterojunction tunnel diodes for tandem solar cell interconnects.** Zolper, J.C.; Klem, J.F.; Plut, T.A.; Tigges, C.P. Sandia National Labs., Albuquerque, NM (United States). [1995]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. (CONF-941203–13: 1. world conference on photovoltaic energy conversion, Waikoloa, HI (United States), 5-9 Dec 1994). Order Number DE95004779. Source: OSTI; NTIS; GPO Dep.

We report a new approach to tunnel junctions that employs a pseudomorphic GaAsSb layer to obtain a band alignment at a InGaAs or InAlAs p-n junction favorable for forward bias tunneling. Since the majority of the band offset between GaAsSb and InGaAs or InAlAs is in the valence band, when an GaAsSb layer is placed at an InGaAs or InAlAs p-n junction the tunneling distance is reduced and the tunneling current is increased. For all doping levels studied, the presence of the GaAsSb-layer enhanced the forward tunneling characteristics. In fact, in a InGaAs/GaAsSb tunnel diode a peak tunneling current sufficient for a 1000 sun intercell interconnect was achieved with $p = 1.5 \times 10^{18}$ cm^{-3} while a similarly doped all-InGaAs diode was rectifying. This approach affords a new degree of freedom in designing tunnel junctions for tandem solar cell interconnects. Previously only doping levels could be varied to control the tunneling properties. Our approach relaxes the doping requirements by employing a GaAsSb-based heterojunction.

7594 (SAND–94-1613C) **Back surface cell structures for reducing recombination in CZ silicon solar cells.** King, R.R. (Siemens Solar Industries, Camarillo, CA (United States)); Mitchell, K.W.; Gee, J.M. Sandia National Labs., Albuquerque, NM (United States). [1994]. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. (CONF-941203–19: 1. world conference on photovoltaic energy conversion, Waikoloa, HI (United States), 5-9 Dec 1994). Order Number DE95005423. Source: OSTI; NTIS; GPO Dep.

Mass-produced terrestrial CZ silicon solar cells are currently entering the domain in which bulk diffusion length is comparable to the cell thickness, so that recombination at the back surface can have a significant effect on device performance. Three manufacturable processes that address the problem of back recombination are examined here: boron diffusion from a deposited doped SiO_2 layer; Al-alloyed layers using screen-printed paste; and use of a collecting n^+ layer on the back interdigitated with the positive electrode. 104-cm^2 cells fabricated at Siemens Solar Industries using these back surface structures are characterized by current-voltage, spectral response, photoconductivity decay, and SIMS measurements.

7595 (SAND–94-3077C) **Rapid thermal processing of high-efficiency silicon solar cells with controlled in-situ annealing.** Doshi, P. (Georgia Institute of Technology, Atlanta, GA (United States). Univ. Center of Excellence for Photovoltaics Research and Education); Rohatgi, A.; Ropp, M.; Chen, Z.; Ruby, D.; Meier, D.L. Sandia National Labs., Albuquerque, NM (United States). [1995]. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. (CONF-941203–12: 1. world conference on photovoltaic energy conversion, Waikoloa, HI (United States), 5-9 Dec 1994). Order Number DE95004729. Source: OSTI; NTIS; GPO Dep.

Silicon solar cell efficiencies of 17.1%, 16.4%, 14.8%, and 14.9% have been achieved on FZ, Cz, multicrystalline (mc-Si), and dendritic web (DW) silicon, respectively, using simplified, cost-effective rapid thermal processing (RTP). These represent the highest reported efficiencies for solar cells processed with simultaneous front and back diffusion with no conventional high-temperature furnace steps. Appropriate diffusion temperature coupled with the added in-situ anneal resulted in suitable minority-carrier lifetime and diffusion profiles for high-efficiency cells. The cooling rate associated with the in-situ anneal can improve the lifetime and lower the reverse saturation current density (J_0), however, this effect is material and base resistivity specific. PECVD antireflection (AR) coatings provided low reflectance and efficient front surface and bulk defect passivation. Conventional cells fabricated on FZ silicon by furnace diffusions and oxidations gave an efficiency of 18.8% due to greater short wavelength response and lower J_0.

7596 (SAND–94-3078C) **Recent progress in the Photovoltaic Manufacturing Technology Project (PVMaT).** Witt, C.E. (National Renewable Energy Lab., Golden, CO (United States)); Mitchell, R.L.; Thomas, H.; Ruby, D.; Herwig, L.O.; Sellers, R. Sandia National Labs., Albuquerque, NM (United States). [1995]. 9p. Sponsored by USDOE, Washington, DC (United States). DOE

Contract AC04-94AL85000. (CONF-941203–14: 1. world conference on photovoltaic energy conversion, Waikoloa, HI (United States), 5-9 Dec 1994). Order Number DE95004782. Source: OSTI; NTIS; GPO Dep.

The Photovoltaic Manufacturing Technology (PVMaT) Project was initiated in 1990 to help the U.S. photovoltaic (PV) industry extend its world leadership role in manufacturing and commercially developing PV modules and systems. It is being conducted in several phases, staggered to support industry progress. The four most recently awarded subcontracts (Phase 2B) are now completing their first year of research. They include two subcontracts in CdTe, one on Spheral Solar™ Cells, and one on cast polysilicon. These subcontracts represent new technology additions to the PVMaT Project. Subcontracts initiated in earlier phases are nearing completion, and their progress is summarized. An additional phase of PVMaT, Phase 4A, is being initiated which will emphasize product-driven manufacturing research and development. The intention of Phase 4A is to emphasize improvement and cost reduction in the manufacture of full-system PV products. The work areas may include, but not limited to, issues such as improvement of module manufacturing processes; system and system component packaging, integration, manufacturing, and balance-of-system development with the goal of product manufacturing improvements.

1406 Photovoltaic Power Systems

7597 (Juel–2855) **Environmental impact statements in research projects. The example of photovoltaic energy conversion. Vol. 1. Summary and results.** Angewandte Systemanalyse, v. 67. Hirtz, W.; Huber, W.; Kolb, G. Forschungszentrum Juelich GmbH (Germany). Programmgruppe Systemforschung und Technologische Entwicklung. Dec 1993. 212p. (In German). Order Number DE95738824. Source: OSTI; NTIS (US Sales Only).

A methodology was developed by which the impact of new technical developments on humans and the environment can be assessed already in the early stages of research. The procedure comprises several stages: Orientation phase, implementation and evaluation phase, validation phase. The procedure was tested for the example of photovoltaic energy conversion. The report describes the for preparation of industrial-quality silicum and of monocrystalline, multicrystalline, and amorphous cells and modules, each with a list of basic materials and emissions. (BWI)

7598 (NREL/TP–411-7402) **Technical evaluation of a dual-junction same-band-gap amorphous silicon photovoltaic system at NREL.** Strand, T.; Mrig, L.; Hansen, R.; Emery, K. National Renewable Energy Lab., Golden, CO (United States). Dec 1994. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC36-83CH10093. (CONF-941203–17: 1. world conference on photovoltaic energy conversion, Waikoloa, HI (United States), 5-9 Dec 1994). Order Number DE95000277. Source: OSTI; NTIS; GPO Dep.

On December 7, 1992, a 1.8-kW_{ac} utility-interconnect photovoltaic (PV) system using amorphous silicon modules was brought on-line at the National Renewable Energy Laboratory's photovoltaic test site. This system was deployed to conduct an in-situ technical evaluation of the PV array (in a high voltage configuration) and system performance and reliability in a utility-interconnect application. The system is unique due to the installation of construction-grade insulation on the back of each PV module. This use of insulation is an attempt to levelize the annual array power output by elevating the operating temperature of the modules. This paper presents array and system performance data. Emphasis is placed on quantifying the effects of individual losses as well as seasonal changes on PV array and system performance.

1407 Solar Thermal Power Systems

7599 (NREL/TP–471-7296) **Comparison of three methods for optical characterization of point-focus concentrators.** Wendelin, T.J. (National Renewable Energy Lab., Golden, CO (United States)); Grossman, J.W. National Renewable Energy Lab., Golden, CO (United States). [1995]. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC36-83CH10093. (CONF-950336–18: American Society of Mechanical Engineers/Japanese Society of Mechanical Engineers/Japan Solar Energy Society international solar energy conference, Maui, HI (United States), 19-24 Mar 1995). Order Number DE95000282. Source: OSTI; NTIS; GPO Dep.

Three different methods for characterizing point-focus solar concentrator optical performance have been developed for specific applications. These methods include a laser ray trace technique called the Scanning Hartmann Optical Test, a video imaging process called the 2f Test, and on-sun testing in conjunction with optical computer modeling. Three concentrator test articles, each of a different design, were characterized using at least two of the methods and, in one case, all three. The results of these test are compared. Excellent agreement was observed in the results, suggesting that the techniques provide consistent and accurate characterizations of solar concentrator optics.

7600 (PNL–10222) **Simulation of diurnal thermal energy storage systems: Preliminary results.** Katipamula, S. (Pacific Northwest Lab., Richland, WA (United States)); Somasundaram, S.; Williams, H.R. Pacific Northwest Lab., Richland, WA (United States). Dec 1994. 43p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. Order Number DE95005751. Source: OSTI; NTIS; GPO Dep.

This report describes the results of a simulation of thermal energy storage (TES) integrated with a simple-cycle gas turbine cogeneration system. Integrating TES with cogeneration can serve the electrical and thermal loads independently while firing all fuel in the gas turbine. The detailed engineering and economic feasibility of diurnal TES systems integrated with cogeneration systems has been described in two previous PNL reports. The objective of this study was to lay the ground work for optimization of the TES system designs using a simulation tool called TRNSYS (TRaNsient SYstem Simulation). TRNSYS is a transient simulation program with a sequential-modular structure developed at the Solar Energy Laboratory, University of Wisconsin-Madison. The two TES systems selected for the base-case simulations were: (1) a one-tank storage model to represent the oil/rock TES system, and (2) a two-tank storage model to represent the molten nitrate salt TES system. Results of the study clearly indicate that an engineering optimization of the TES system using TRNSYS is possible. The one-tank stratified oil/rock storage model described here is a good starting point for parametric studies of a TES system. Further developments to the TRNSYS library of available models (economizer, evaporator, gas turbine, etc.) are recommended so that the phase-change processes is accurately treated.

1409 Solar Thermal Utilization

Refer also to citation(s) 7586, 7603

7601 (DTU-LV-MEDD–267) **MF-demonstration project at Wewer's Brickyard in Helsinge.** Oestergaard Jensen, S. Danmarks Tekniske Univ., Lyngby (Denmark). Lab. for Varmeisolering. Nov 1994. 135p. Contract ENS-51181-91.0020. Order Number DE95737590. Source: OSTI; NTIS.

The present report describes the experience gained from measurements carried out on a building equipped with a 126 m^2 Multi-Function Solar Energy Panel. The report is the conclusion of a project co-financed by the Commission of the European Communities with the name 'Demonstration of Multi-Function Solar Energy Panels', SE 417/87. Part of the measuring system has been supported by a project financed by the Danish Ministry of Energy J.no. 51181/91-0020. (au)

7602 (KE–93002G) **Development of the basis technique for the Local Energy.** Yang, Y.S (Korea Institute of Energy Research, Taejon (Korea, Republic of)); Cho, Y.S. No corporate text available. Dec 1993. 165p. (In Korean). Order Number DE95744265. Source: OSTI; NTIS (US Sales Only).

This study for the effective use of local energy is considered as follows: - background and policy of energy conservation by the local energy - optimum design of green-house system for heating and cooling - study on the heat pump system using solar energy

and thermal(underground) water with low temperature heat source. (author). refs., figs., tabs.

1410 Solar Collectors and Concentrators

7603 (DTU-LV-MEDD–264) **Improvement of effect of a solar heating system.** Kristiansen, F.; Oestergaard Jensen, S. Danmarks Tekniske Univ., Lyngby (Denmark). Lab. for Varmeisolering. Sep 1994. 84p. (In Danish). Contract ENS-51181-93.0020. Order Number DE95737562. Source: OSTI; NTIS.

This report describes an investigation of the increase in performance for a solar heating system through use of combined air/liquid collectors instead of the usual liquid collectors. The efficiency of two different air/liquid collectors was measured under standard conditions in the solar simulator at the Thermal Insulation Laboratory, and different types of efficiency formulas were derived. One of the collectors was a commercial product from the manufacturer Aidt Miljoe, and the other was a prototype of the so-called MF/AW-collector (Multi-Function/Air-Water-collector). During the tests it was found that the air section of the MF/AW-collector was rather leaky so that a substantial part of the air bypassed the absorber. Thus the collector showed much lower efficiency than expected, and decreasing efficiency at increasing air flow rates. Based on the efficiency test, computer simulations of the performance of solar systems with the two collector types have been carried out, with two different programs. Combined systems with 5 m^2 solar collectors for one-family houses were investigated and compared with a similar system with normal liquid collectors. None of the simulation programs developed so far can handle combined air/liquid systems correctly, and it was therefore necessary to make a number of simplifying assumptions regarding the operation and control of the solar system in order to carry out the simulations. The different simplifications leading to different estimates of the performance have been compared and discussed in the report. (au)

1420 Heat Storage

Refer also to citation(s) 7600

7604 (IKE-5–240) **Theoretical and experimental investigation of a high-temperature latent heat storage system with a salt ceramic composite as storage medium.** Kim, Soo Kyung. Stuttgart Univ. (Germany). Inst. fuer Kernenergetik und Energiesysteme. Aug 1994. 98p. (In German). Order Number DE95738270. Source: OSTI; NTIS (US Sales Only).

In this paper a theoretical and experimental investigation of the transient thermal behavior of a heat storage system is presented. A composite salt/ceramic material is employed as a Thermal Energy Storage (TES) medium with the aim to recover industrial waste heat. The TES medium consists of a solid micro-porous structure of a ceramic matrix, the pores of which are filled with salt. The salt undergoes a phase change at the melting temperature or over a temperature interval, where its latent heat is stored or released. The sensible heat of both the ceramic matrix and the salt can be utilized in a wide temperature range, depending on the specific operating conditions of the store. The molten salt is retained within the pores of the ceramic matrix by capillary forces, which makes the direct-contact heat exchange between the TES medium and the Heat Transfer Fluid (HTF) possible. The theoretical investigation of the TES system is based on a numerical approach. The energy conservation equation for the TES medium is expressed three-dimensional in rectangular coordinates, to take into account the effects of heat losses to the surroundings and the local variation of the HTF inlet boundary conditions. The equation is formulated with the enthalpy method. For better accounting of the real case, the energy equation for the storage container wall is also considered. The energy equations are discretized by the control volume method and the resulting difference equations are solved by an explicit finite difference method applying the Heun's predictor-corrector method. For modelling the storage unit, lumped elements interacting with the HTF and also shape factors and lumped heat transfer coefficients are introduced. Because of the nonlinearity of the equations due to the temperature dependent thermophysical properties, an interactive scheme is used for the solution. (orig.)

15 GEOTHERMAL ENERGY

1502 Geology and Hydrology of Geothermal Systems

Refer also to citation(s) 7328

7605 (LBL–36208) **Seismic monitoring at the Geysers Geothermal Field.** Romero, A.E. Jr.; Kirkpatrick, A.; Majer, E.L.; Peterson, J.E. Jr. Lawrence Berkeley Lab., CA (United States). Sep 1994. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00098. (CONF-941043–6: 1994 annual meeting of the Geothermal Resources Council: restructuring the geothermal industry, Salt Lake City, UT (United States), 2-5 Oct 1994). Order Number DE95004672. Source: OSTI; NTIS; GPO Dep.

This report summarizes the efforts of LBL to utilize MEQ data in reservoir definition as well as in evaluating its performance. Results of the study indicate that the velocity and attenuation variations correlate with the known geology of the field. At the NW Geysers, high velocity anomalies correspond to metagraywacke and greenstone units while low velocity anomalies seem to be associated with Franciscan melanges. Low Vp/Vs and high attenuation delineate the steam reservoir suggesting undersaturation of the reservoir rocks. Ongoing monitoring of Vp/Vs may be useful in tracking the expansion of the steam zone with time. Spatial and temporal patterns of seismicity exhibit compelling correlation with geothermal exploitation. Clusters of MEQs occur beneath active injection wells and appear to shift with changing injection activities. High resolution MEQ locations hold promise for inferring fluid flow paths, especially in tracking injectate. This study has demonstrated that continuous seismic monitoring may be useful as an active reservoir management tool.

1503 Geothermal Exploration and Exploration Technology

7606 (DOE/ER/14217–2) **Transport in porous and fractured media of the Creede Formation.** Conca, J.L. Washington State Univ., Richland, WA (United States). [1995]. 18p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG06-91ER14217. Order Number DE95004260. Source: OSTI; NTIS; GPO Dep.

Direct measurement was made of the hydraulic conductivity of Creede Formation rocks using a new experimental method. The UFA™ method employs open-flow centrifugation. Centrifugation, like gravity, has the effect on a material of a whole-body force exerting equal force at all points within the sample. The equivalent gravitational force exerted throughout the sample can be chosen to be from one to four orders of magnitude higher than earth gravity (from 10 to 10,000 g). The result is an increase in rate of fluid flow equally at all points throughout the sample so that hydraulic steady state is obtained in most geologic materials in hours, even under highly unsaturated conditions. This extraordinarily short time allows direct measurement of transport parameters, such as hydraulic conductivity, diffusion coefficient, and retardation factors, in any porous media over the complete range of field moisture contents. Hydraulic conductivities in the Creede Formation rocks ranged from 10^{-12} cm/s to 10^{-7} cm/s (10^{-9} Darcy to 10^{-4} Darcy) and showed no correlation with any other physical or mineralogical properties including porosity. The high degree of alteration to clay minerals appears to obscure any porosity/permeability relationship of the kind that occurs in many reservoir rocks. However, down-hole neutron porosities correlated well with laboratory-determined porosities. The objective of this investigation is to determine the hydrologic transport parameters of Creede Formation rocks for use in transport model development and for image analysis of transport pathways to produce a porosity/permeability evolution curve in support of geochemical and isotopic water/rock interaction models.

1505 Economic, Industrial, and Business Aspects

7607 (DOE/GO–10094-005) **Geothermal Program Review 12: Geothermal Energy and the President's Climate Change**

Action Plan. USDOE Assistant Secretary for Conservation and Renewable Energy, Washington, DC (United States). Geothermal Div. [1994]. 289p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC36-83CH10093. (CONF-9404102–: 12. geothermal program review: geothermal's role in global climate change - impacts on the Climate Change Action Plan, San Francisco, CA (United States), 25-28 Apr 1994). Order Number DE94011892. Source: OSTI; NTIS; GPO Dep.

Geothermal Program Review XII, sponsored by the Geothermal Division of US Department of Energy, was held April 25–28, 1994, in San Francisco, California. This annual conference is designed to promote effective technology transfer by bringing together DOE-sponsored researchers; utility representatives; geothermal energy developers; suppliers of geothermal goods and services; representatives from federal, state, and local agencies; and others with an interest in geothermal energy. In-depth reviews of the latest technological advancements and research results are presented during the conference with emphasis on those topics considered to have the greatest potential to impact the near-term commercial development of geothermal energy.

1508 Geothermal Power Plants

7608 (EGG-M–94185) **Field investigations examining the impact of supersaturated vapor expansions on turbine performance.** Mines, G.L. EG and G Idaho, Inc., Idaho Falls, ID (United States). [1995]. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC07-76ID01570. (CONF-9404102–8: 12. geothermal program review: geothermal's role in global climate change - impacts on the Climate Change Action Plan, San Francisco, CA (United States), 25-28 Apr 1994). Order Number DE95005000. Source: OSTI; NTIS; GPO Dep.

Investigators in the Heat Cycle Research project are developing a technology base which will permit the increased utilization of the moderate-temperature, liquid-dominated geothermal resource for the production of electrical power. The project investigations have focused upon power cycles which have the potential for the increased utilization (power produced per unit quantity of fluid) of the hydrothermal resource. The investigations to date have confirmed the viability of technology required to incorporate concepts which will allow the binary power cycle to have a performance approaching practical thermodynamic maximums. Investigations in progress are examining the potential improvements that result from allowing super-saturated turbine expansions. During these metastable expansions, the working fluid is maintained as a supersaturated vapor during the turbine expansion process; if at equilibrium conditions, liquid condensate would be present. If it can be shown that these expansions proceed without a degradation in turbine performance or damage to the turbine internals by any condensate which forms, a projected 8% improvement in the performance of the advanced cycle could be realized. Investigators are presently examining the condensation behavior of these expansions, as well as determining the impact of these expansions on turbine performance.

1520 Geothermal Data and Theory

Refer also to citation(s) 7365, 8648

17 WIND ENERGY

1704 Economic, Industrial, and Business Aspects

Refer also to citation(s) 7561, 7610, 7626

7609 (NEI-DK–1772) **Wind energy market study Eastern Europe. Czech and Slovak Republics.** Skjerk Christensen, P. Risoe National Lab., Roskilde (Denmark). Systems Analysis. Jun 1994. 30p. Order Number DE95737560. Source: OSTI; NTIS; INIS.

The main objective of the THERMIE Associated Measure WE05 is to study the conditions for utilising wind power and estimate the market for wind power in Eastern Europe. This report describes the results of a study of the conditions in the Czech and Slovak republics, which has been concentrated on the following areas: A collection of information on the wind energy potential in these countries and the present structure of the power production system including costs; A search for information concerning payback prices, subsidies, etc. with relation to renewable energy sources, especially wind power, existing wind turbines and their production; An estimate of the possibilities for co-production of wind turbines by Czech, Slovak, and EC factories; A compilation of information on rules and legislation pertaining to the establishment of wind turbines and to power production by wind, e.g. regulations related to grid connections, safety, and environmental production. In order to promote the utilisation of wind power in the Czech and Slovak Republics, some recommendations based on this study may be put forward: the operation of pilot plants should be evaluated in order to compare the recorded production with that which is estimated theoretically based on measured wind data. Existing wind data should be supplemented with new measurements especially at sites that based on current knowledge may be suitable for establishing wind parks. The economic feasibility of wind power in these countries should be calculated based on the best available physical and economic data. (EG)

1706 Wind Energy Engineering

Refer also to citation(s) 8049, 8239

7610 (NEI-DK–1773) **Wind energy market study Eastern Europe. Poland.** Skjerk Christensen, P. Risoe National Lab., Roskilde (Denmark). Systems Analysis. Apr 1994. 23p. Order Number DE95737561. Source: OSTI; NTIS; INIS.

The main objective of the THERMIE Associated Measure WE05 is to study market conditions and estimate the market for wind power in Eastern Europe. This report describes the results of a study of the conditions in Poland, which has been concentrated on the following areas: wind energy potential in Poland; data concerning the present structure of the power production system including costs; payback prices, subsidies, etc. with relation to renewable energy sources, especially wind power; information on existing wine turbines and their production in Poland; possibilities for co-production of wind turbines by Polish and EC factories, and rules and legislation pertaining to the establishment of wind turbines and to power production by wind, eg regulations related to grid connection, safety and environment. According to existing data there are possibilities for using the wind potential in certain parts of poland. The wind data have to be improved if particular sites are considered for wind parks. The current official plans concerning the energy system have taken renewable sources into consideration, including wind power that is estimated to contribute $\approx$ 1 GWh by 2005-2010. Wind turbines may be connected to the public grid with due regard to the strength of the line. Presently, the owner has to pay all the costs, however, new rules are under consideration. The conditions for the connection and operation of wind turbines have to be discussed with the particular utility on an ad-hoc basis. (EG)

7611 (NEI-DK–1795) **Lightning protection of wind turbine generator systems and EMC problems in the associated control systems.** Maribo Pedersen, B. (ed.). Danmarks Tekniske Univ., Lyngby (Denmark). Afd. for Fluid Mekanik. 1994. 164p. (CONF-9403191–: 26. Meeting of experts on lightning protection of wind turbine generator systems and EMC problems in the associated control systems, Cologno Monzese (Italy), 8-9 Mar 1994). Order Number DE95737572. Source: OSTI; NTIS.

On the 8th and 9th of March 1994 an invited group assembled at the Centro Ricerca Elettrica of ENEL in Milan to discuss lightning protection of wind turbine generator systems. Wind turbines are tall structures and are often located in high level thunderstorm areas and positioned on the top of hills. Consequently they are highly exposed to lightning and cases have been reported of damages and malfunctioning following lightning strikes. The damages have involved from one side the blades and the structure and from the other side have affected the performance of the inner electric/electronic parts. In the following the main aspects of interest are mentioned. The economic impact of lightning depends on the probability that a given wind turbine is struck by a lightning. This probability depends on: the lightning flash density of the territory; the geometry of the wind turbine; the installation site orography;

the presence of adjacent structures. Several models and criteria are available for the evaluation of the probable number of strokes to wind turbines. (EG)

7612 (NEI-DK–1795, pp. 5-14) **Lightning protection of wind turbine generator systems. Service experience from Norway and proposed solutions to reduce lightning damage.** Schei, A. (Transinor A/S (Norway)). Danmarks Tekniske Univ., Lyngby (Denmark). Afd. for Fluid Mekanik. 1994. (CONF-9403191–: 26. Meeting of experts on lightning protection of wind turbine generator systems and EMC problems in the associated control systems, Cologno Monzese (Italy), 8-9 Mar 1994). In *Lightning protection of wind turbine generator systems and EMC problems in the associated control systems.* 164p. Order Number DE95737572. Source: OSTI; NTIS.

This paper presents an overview of the service experience with respect to lightning damages to wind turbine generator systems in Norway during the period 1986 to February 1994. The systems covered except one (V-aa) are all located on the north-west coast of the southern part of Norway, where exposure to positive lightning strokes during the winter season is very well known. After the presentation of typical lightning data and service experience, the paper try to analyze the reason of the damages and put forward proposals to modify the systems with the aim to obtain better service reliability. Today the failure rates due to lightning are far too high (one per year and wind turbine system) to be acceptable. The aim is to open up for discussion of the problems and the ideas of how to solve them. (au)

7613 (NEI-DK–1795, pp. 15-54) **Lightning and the impact on wind turbine generation.** Muljadi, E. (National Renewable Energy Laboratory, Golden, CO (United States)); Butterfield, C.P. Danmarks Tekniske Univ., Lyngby (Denmark). Afd. for Fluid Mekanik. 1994. (CONF-9403191–: 26. Meeting of experts on lightning protection of wind turbine generator systems and EMC problems in the associated control systems, Cologno Monzese (Italy), 8-9 Mar 1994). In *Lightning protection of wind turbine generator systems and EMC problems in the associated control systems.* 164p. Order Number DE95737572. Source: OSTI; NTIS.

The utility power industries have been studying the nature of lightning and its impact on power systems for many years. This study allows them improve reliability and power quality of the power systems. Lightning is known to be one of the causes of electrical breakdown in transmission lines and telecommunication lines. The reliability of power sources from the utility affects many people directly or indirectly. A breakdown in any part of the power network may eventually cost millions of dollars if it triggers the interruption of industrial processes. With the increasing penetration of wind power generation into the utility grid, the lightning problem forces the utility engineer to start thinking about minimizing the casualties of lightning on the wind turbine generation systems on the wind farm. It is necessary for the power engineer to learn and better understand about the nature of the lighting, as well as the protection against lightning. This paper deal with the cause and effect of power disturbance due to lightning on wind power generation. The protection of the system from the lightning is similar to insurance requirements. We have to understand the nature of the lightning and the statistical data of the lightning before we finally decide on how much we should invest on lightning protection. The data of lightning occurrences on the wind farm and the preventative measures practiced by the wind farm will be presented as well. (au) (15 refs.)

7614 (NEI-DK–1795, pp. 55-68) **Lightning protection of large rotor blades design and experience.** Dalen, G. (Vattenfall Utveckling AB (Sweden)). Danmarks Tekniske Univ., Lyngby (Denmark). Afd. for Fluid Mekanik. 1994. (CONF-9403191–: 26. Meeting of experts on lightning protection of wind turbine generator systems and EMC problems in the associated control systems, Cologno Monzese (Italy), 8-9 Mar 1994). In *Lightning protection of wind turbine generator systems and EMC problems in the associated control systems.* 164p. Order Number DE95737572. Source: OSTI; NTIS.

Wind Turbines become bigger and bigger. The cost involved with maintenance must be kept to a minimum. Damage due to lightning strikes can be very severe and expensive. New materials are used in the rotor blades that may lead to new problems regarding lightning protection. Sweden and Vattenfall have been involved in large Wind Turbines for many years. This paper describes the design and experience regarding lightning protection of rotor blades for Wind Turbines. Three examples will be described: The Maglarp Wind Turbine, the Naesudden II Wind Turbine and the experience from Lyse Wind Power Station. (au)

7615 (NEI-DK–1795, pp. 69-78) **Lightning flashes to non-conductive (fibre glass) rotor blades of wind turbines.** Pedersen, Aa.E. (Technical University of Denmark, Lyngby (Denmark)). Danmarks Tekniske Univ., Lyngby (Denmark). Afd. for Fluid Mekanik. 1994. (CONF-9403191–: 26. Meeting of experts on lightning protection of wind turbine generator systems and EMC problems in the associated control systems, Cologno Monzese (Italy), 8-9 Mar 1994). In *Lightning protection of wind turbine generator systems and EMC problems in the associated control systems.* 164p. Order Number DE95737572. Source: OSTI; NTIS.

In the past, there have been repeated discussions concerning the probabilities of lightning flashes to conductive and non-conductive objects, and concerning the way in which the interception efficiency is influenced by the resistances of the object, including the effect of the value of the grounding resistance. Opinions have ranged from the belief that non-conductive objects were self-protecting, to the belief that objects with and without lightning protection were exposed to approximately the same striking probability, regardless of the resistances in the objects. The same controversy has existed for wind turbines equipped with non-conductive rotor blades (f. inst. fibre glass). In connection with an analysis of lightning damage to a fibre glass rotor blade of a wind turbine, evidence of importance for the solution of this controversy has been revealed. (au)

7616 (NEI-DK–1795, pp. 79-83) **Current distribution and indirect effects on a wind power generator following a lightning stroke.** Garbagnati, E. (ENEL S.p.A. Cologno M. (Italy)); Pandini, L. Danmarks Tekniske Univ., Lyngby (Denmark). Afd. for Fluid Mekanik. 1994. (CONF-9403191–: 26. Meeting of experts on lightning protection of wind turbine generator systems and EMC problems in the associated control systems, Cologno Monzese (Italy), 8-9 Mar 1994). In *Lightning protection of wind turbine generator systems and EMC problems in the associated control systems.* 164p. Order Number DE95737572. Source: OSTI; NTIS.

Following a lightning stroke the current flows through the various parts of the wind mill, with possible damages (example damages to the bearing). Furthermore the current flowing generates electromagnetic fields which could affect the behavior of the electrical and electronic apparats inside the wind mill. (au)

7617 (NEI-DK–1795, pp. 109-123) **Lightning stroke simulation by means of a leader progression model.** Dellera, L. (CESI, Milan (Italy)); Garbagnati, E. Danmarks Tekniske Univ., Lyngby (Denmark). Afd. for Fluid Mekanik. 1994. (CONF-9403191–: 26. Meeting of experts on lightning protection of wind turbine generator systems and EMC problems in the associated control systems, Cologno Monzese (Italy), 8-9 Mar 1994). In *Lightning protection of wind turbine generator systems and EMC problems in the associated control systems.* 164p. Order Number DE95737572. Source: OSTI; NTIS.

The knowledge of the frequency of lighting strikes on a wind power generator is one of the most important parameters in judging its reliability. To evaluate the probable number of direct strikes on the generator structure a model of the 'lightning mechanism' is needed which allows the impact point to be defined by taking into account both the main lightning parameters and the effects related to the orography of the point of installation. From among the algorithms available the model implemented by ENEL-CESI is the only one that simulates the progression of lightning channels form the cloud to the earth, taking into account the orography. (au) (21 refs.)

7618 (NEI-DK–1795, pp. 125-134) **Lightning tests on windmill blades.** Garbagnati, E. (ENEL S.p.A., Cologno M. (Italy)); Pigini, A.; Ballarin, F. Danmarks Tekniske Univ., Lyngby (Denmark). Afd. for Fluid Mekanik. 1994. (CONF-9403191–: 26. Meeting of experts on lightning protection of wind turbine generator systems and EMC problems in the associated control systems, Cologno Monzese (Italy), 8-9 Mar 1994). In *Lightning protection of*

wind turbine generator systems and EMC problems in the associated control systems. 164p. Order Number DE95737572. Source: OSTI; NTIS.

Testing activity was performed to determine the behavior of windmill blades following lightning strokes. In fact, for windmill power stations, depending on the area where they are installed and the structure of the windmills, there is a good possibility that a windmill may be struck by lightning. The parts with the highest risk of a lightning stroke are the blades. The impact of the lightning and the current flow over different parts may cause structural damage ('direct effects' of lightning) and thus prevent the windmill from operating at full capacity. (au)

7619 (NEI-DK–1795, pp. 149-153) **Earthing of wind farms - a report of work in progress.** Jenkins, N. (Department of Electrical Engineering and Electronics, UMIST, Manchester (United Kingdom)); Vaudin, A. Danmarks Tekniske Univ., Lyngby (Denmark). Afd. for Fluid Mekanik. 1994. (CONF-9403191–: 26. Meeting of experts on lightning protection of wind turbine generator systems and EMC problems in the associated control systems, Cologno Monzese (Italy), 8-9 Mar 1994). In *Lightning protection of wind turbine generator systems and EMC problems in the associated control systems.* 164p. Order Number DE95737572. Source: OSTI; NTIS.

There is now some 140 MW of installed wind turbine capacity in the UK, concentrated in the high wind speed areas of Wales and the western parts of England. The latest round of the Non fossil Fuel Obligation, which provides the premium price for wind power, is likely to see at least a doubling of this capacity as well as installations in Scotland and Northern Ireland. A typical wind farm consists of some 15-30 medium size (300-400 kW) wind turbines spread out over a wide area. The ground of the upland areas of the west of England and Wales is usually rocky with only a shallow layer of topsoil or peat. Therefore earthing (or grounding in US terminology) of extensive wind farms on high resistivity rocky soil has presented a considerable challenge to wind farm designers. In the rocky ground of wind farm sites it is not practical to use driven rod electrodes. Therefore, long horizontal strip conductors are laid in the trenches of the power collection cable network. On some sites these electrodes may be up to 5 km in length. The UK standards give little guidance o how a suitable earthing system using these very long electrodes might be designed, installed or tested and so a research project was undertaken by UMIST and National Wind Power with support from the UK Department of Trade and Industry. (au)

7620 (NREL/TP–440-7224) **Wind technology development: Large and small turbines.** Thresher, R.W.; Hock, S.M.; Loose, R.R.; Goldman, P. National Renewable Energy Lab., Golden, CO (United States). Dec 1994. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC36-83CH10093. (CONF-941210–2: Power generation conference, Orlando, FL (United States), 7-9 Dec 1994). Order Number DE95000286. Source: OSTI; NTIS; GPO Dep.

Wind technology has developed rapidly over the last decade with the design and development of advanced systems with improved performance, higher reliability, and lower costs. During the past several years, substantial gains have been made in wind turbine designs, lowering costs to an average of $0.05/(kWh) while further technology development is expected to allow the cost to drop below $0.04/(kWh) by 2000. As a result, wind is expected to be one of the least expensive forms of new electric generation in the next century. This paper will present the technology developments for both utility-scale wind turbines and remote, small-village wind turbines that are currently available or in development. Technology innovations are being adapted for remote and stand-alone power applications with smaller wind turbines. Hybrid power systems using smaller 1 to 50 (kW) wind turbines are being developed for non-grid-connected electrical generation applications. These village power systems typically use wind energy, photovoltaics, battery storage, and conventional diesel generators to power remote communities. Smaller turbines are being explored for application as distributed generation sources on utility grids to supply power during periods of peak demand, avoiding costly upgrades in distribution equipment. New turbine designs now account for turbulence-induced loads, unsteady aerodynamic stall effects, and complex fatigue loads, making use of new technology developments such as advanced airfoils. The new airfoils increase the energy capture, improve the operating efficiency, and reduce the sensitivity of the airfoils to operation roughness. Electronic controls are allowing variable rotor speed operation; while aerodynamic control devices, such as ailerons and flaps, are used to modulate power or stop the rotor in high-speed conditions. These technology trends and future turbine configurations are being sponsored and explored by the U.S. Department of Energy's Wind Energy Program.

7621 (NREL/TP–441-7077) **Using digital filtering techniques as an aid in wind turbine data analysis.** Young, T. (Univ. of Colorado, Boulder, CO (United States). BioServe Space Technologies). National Renewable Energy Lab., Golden, CO (United States). Nov 1994. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC36-83CH10093. (CONF-9304280–1: AIAA Region 5 student conference, Ft. Collins, CO (United States), 21-24 Apr 1993). Order Number DE94011862. Source: OSTI; NTIS; GPO Dep.

Research involving very large sets of digital data is often difficult due to the enormity of the database. In the case of a wind turbine operating under varying environmental conditions, determining which data are representative of the blade aerodynamics and which are due to transient flow ingestion effects or errors in instrumentation, operation, and data collection is of primary concern to researchers. The National Renewable Energy Laboratory in Golden, Colorado collected extensive data on a downwind horizontal axis wind turbine (HAWT) during a turbine test project called the Combined Experiment. A principal objective of this experiment was to provide a means to predict HAWT aerodynamic, mechanical, and electrical operational loads based upon analytical models of aerodynamic performance related to blade design and inflow conditions. In a collaborative effort with the Aerospace Engineering Department at the University of Colorado at Boulder, a team of researchers has evolved and utilized various digital filtering techniques in analyzing the data from the Combined Experiment. A preliminary analysis of the data set was performed to determine how to best approach the data. The reduced data set emphasized selection of inflow conditions such that the aerodynamic data could be compared directly to wind tunnel data obtained for the same airfoil design as used for the HAWT's blades. It will be shown that this reduced data set has yielded valid, reproducible results that a simple averaging technique or a random selection approach cannot achieve. These findings provide a stable baseline against which operational HAWT data can be compared.

7622 (NREL/TP–442-7111) **GPP user's guide - a general-purpose postprocessor for wind turbine data analysis.** Buhl, M.L. Jr. National Renewable Energy Lab., Golden, CO (United States). Jan 1995. 39p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC36-83CH10093. Order Number DE95000293. Source: OSTI; NTIS; GPO Dep.

GPP (pronounced "jeep") is a General-Purpose Postprocessor for wind turbine data analysis. The author, a member of the Wind Technology Division (WTD) of the National Renewable Energy Laboratory (NREL), developed GPP to postprocess test data and simulation predictions. GPP reads data into large arrays and allows the user to run many types of analyses on the data stored in memory. It runs on inexpensive computers common in the wind industry. One can even use it on a laptop in the field. The author wrote the program in such a way as to make it easy to add new types of analyses and to port it to many types of computers. Although GPP is very powerful and feature-rich, it is still very easy to learn and to use. Exhaustive error trapping prevents one from losing valuable work due to input errors. GPP will, hopefully, make a significant impact on engineering productivity in the wind industry.

7623 (RISO-R–714(EN)) **Wind turbine test Nordtank NTK 500/37. System test.** Markkilde Petersen, S. Risoe National Lab., Roskilde (Denmark). Test Station for Wind Turbines. Dec 1994. 110p. Contract ENS-5332-0001. Order Number DE95737595. Source: OSTI; NTIS; Also available from Risoe Library, P.O. Box 49, DK-4000 Roskilde, Denmark.

The report describes measurements carried out on the Nordtank NTK 500/37 wind turbine during the period from September 1992 to September 1993. The measurements were carried out at Risoe located near Roskilde Fjord. The test site, the wind turbine, the data acquisition system and the calibration procedures are described. Measurements are made in accordance to a 'system test' as described in the Danish rules for type approval and certification. The safety tests include breaking sequences at normal operation with and without tip brakes and runaway test. The tests are shown as time series. Dynamic response analysis of the wind turbine was carried out during standstill and at normal operational conditions at low and high wind speeds. Selected runs are shown as time tracks at low and high wind speeds. The structural loads are analyzed statistically. Ten minutes mean, standard deviation, maximum, and minimum values are shown as function of the wind speed. The fatigue loads including blade, rotor and tower loads are evaluated using rainflow counting. The equivalent load ranges are calculated at different wind speeds and turbulence, and at forced yaw misalignments. (au) (11 tabs., 123 ills., 5 refs.)

7624 (RISO-R–730(EN)) **Verification of design basis 2 - a coupled aeroelastic wind turbine model.** Larsen, G.C.; Soerensen, P. Risoe National Lab., Roskilde (Denmark). Test Station for Wind Turbines. Oct 1994. 153p. Contract ENS-1364/92-0005. Order Number DE95737571. Source: OSTI; NTIS; Also available from Risoe Library, P.O. Box 49, DK-4000 Roskilde, Denmark.

EFP-92.

A coupled aeroelastic horizontal axis wind turbine model has been developed, and the model has been implemented in an user-friendly computer package to run on a personal computer. The code is so far designed for modelling wind turbines in normal operation outside the stall region, and includes three categories of models. These are a load part (i.e. wind field description, gravity, centrifugal forces, Coriolis forces, and inertia forces due to elastic deformations), an aerodynamic part, and a structural dynamic part. The structural model comprises two degrees of freedom on each blade, one degree of freedom on both main shaft and generator, and four degrees of freedom related to the tower. The main characteristics of the model are briefly described, but the primary goal of the present report is to present example solution with the code that verify and demonstrate its usage. For that purpose measurements and simulations, related to both simple deterministic load cases and to more complex scenarios involving loads of both deterministic and stochastic character, have been compared. The simple load cases include loads from gravity- and centrifugal forces, and fully satisfactory predictions were obtained from the model. For the complex load cases three turbines, ranging in size from 300 kW to 2 MW and operating under different conditions (with respect to mean wind speed, turbulence intensity, turbulence length scale, and coherence), have been simulated with the code and subsequently compared with measurements performed. Blade-, rotor, and tower loads have been compared in terms of time series, azimuthal binned signals, and power spectra. A most satisfactory consistency between simulations and measurements is obtained for the load cases outside the stall-region, in agreement with the aerodynamic linearizations inherent in the model. (au) (13 tabs., 131 ills., 11 refs.)

1707 Health and Safety

Refer also to citation(s) 7611, 7612, 7613, 7614, 7615, 7616, 7617, 7618, 7619, 8240

7625 (NEI-DK–1795, pp. 85-94) **Evaluation of the damages caused by lightning current flowing through bearings.** Celi, O. (High Voltage Division - CESI, Milano (Italy)); Pigini, A.; Garbagnati, E. Danmarks Tekniske Univ., Lyngby (Denmark). Afd. for Fluid Mekanik. 1994. (CONF-9403191–: 26. Meeting of experts on lightning protection of wind turbine generator systems and EMC problems in the associated control systems, Cologno Monzese (Italy), 8-9 Mar 1994). In *Lightning protection of wind turbine generator systems and EMC problems in the associated control systems.* 164p. Order Number DE95737572. Source: OSTI; NTIS.

A laboratory for lightning current tests has been set up at CESI allowing the generation of the lightning currents foreseen by the Standards. Lightning tests are carried out on different objects, aircraft materials and components, evaluating the direct and indirect effects of lightning. Recently a research has been carried out to evaluate the effects of the lightning current flow through bearings with special reference to wind power generator applications. For this purpose, lightning currents of different amplitude have been applied to bearings in different test conditions and the damages caused by the lightning current flow have been analysed. The influence of the load acting on the bearing, the presence of lubricant and the bearing rotation have been studied. (au)

7626 (NEI-DK–1795, pp. 95-100) **A methodology for the evaluation of lightning protection measures for wind turbine generating stations.** Behnke, M.R. (Kenetech Windpower, Inc., Livermore, California (United States)). Danmarks Tekniske Univ., Lyngby (Denmark). Afd. for Fluid Mekanik. 1994. (CONF-9403191–: 26. Meeting of experts on lightning protection of wind turbine generator systems and EMC problems in the associated control systems, Cologno Monzese (Italy), 8-9 Mar 1994). In *Lightning protection of wind turbine generator systems and EMC problems in the associated control systems.* 164p. Order Number DE95737572. Source: OSTI; NTIS.

A systematic approach to the economic evaluation of lightning protection measures for wind turbine generating stations has been developed and applied by a major wind turbine manufacturer and wind project developer. The methodology utilizes the application of basic and generally accepted lightning protection principles to allow for performance of payback analyses of lightning protection measures on a site specific basis. In this way, capital investment and maintenance resources may be directed to the measures with the greatest potential returns. (au)

20 FOSSIL-FUELED POWER PLANTS

2001 Power Plants and Power Generation

Refer also to citation(s) 8049

7627 (ANL/ES/CP–83413) **Heat-rate improvements obtained by retubing condensers with new, enhanced tube types.** Rabas, T.J. (Argonne National Lab., IL (United States)); Taborek, J. Argonne National Lab., IL (United States). [1995]. 21p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-941142–28: American Society of Mechanical Engineers' winter annual meeting, Chicago, IL (United States), 9-11 Nov 1994). Order Number DE95004509. Source: OSTI; NTIS; GPO Dep.

Significant fuel savings can be achieved at power plants by retubing the condensers with enhanced tubes. Because of the higher overall heat-transfer coefficient, the exhaust steam is condensed at a lower pressure and the plant efficiency is therefore increased or plant heat rate is reduced. Only the spirally indented type of enhanced tube is currently being used in the U.S. and most other countries; however, different types of enhanced tubes have been proposed for power-plant condensers, each with their own set of attributes. This paper determines what attributes and their magnitudes of enhanced tubes lead to the most energy savings as measured by reduction of the plant heat rate. The particular attributes considered are the inside and outside enhancement levels, the inside efficiency index (inside enhancement level divided by pressure-drop increase), and the enhanced-tube fouling-rate multiplier. Two particular condensers were selected because all necessary information were known from previous heat-rate studies such as the condenser geometry, the circulating-water pump and system information, and the low-pressure turbine characteristics. These are "real-world" condensers and therefore the finding will be representative for many other condenser-retubing applications. However, the authors strongly recommend that an economic evaluation be performed at each site to determine the energy savings and payback time. This generic investigation showed that the outside enhancement level is the most important attribute, and a value of about 1.5 can lead to heat-rate savings of about 20 to 40 Btu/kW-hr. Increasing the inside enhancement is less effective because

of the increased pressure drop that leads to a reduction of the coolant flow rate and velocity.

7628 (DOE/FE/62803–T1) **SYNCHEM feasibility report: Phase 1.** Texaco Development Corp., White Plains, NY (United States). [1995]. 246p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG01-93FE62803. Order Number DE95004516. Source: OSTI; NTIS; GPO Dep.

Several Czech and US companies have entered into a development agreement for the purposes of determining the technical and economic feasibility and overall financeability of an integrated gasification combined cycle (IGCC) regional energy facility to be located adjacent to the Chemopetrol refinery in Litvinov, Czech Republic. The Project would use a feedstock comprised of coal supplied by Doly a upravny Komorany s.p. (DUK) coal mining company and mined from the Most/Litvinov area together with high sulfur residual oils from the Chemopetrol refinery. When gasified together with oxygen from an Air Products air separation plant, and based on an average yearly consumption of 2,100K metric tons per year of coal (as delivered) and 630K tonnes per year of oil, approximately 11 million normal cubic meters per day of syngas will be produced. At its current projected design capacity, when combusted in two General Electric advanced technology Frame 9FA gas turbines, the Project will produce approximately 690MW of electric power; 250 metric tons/hour of steam for process; and 135 thermal equivalent MW of district heat. The Feasibility Phase efforts described in this report indicate the real possibility for a successful and profitable IGCC Project for the Czech Republic. It is therefore incumbent upon all the Project Participants to review and evaluate the information contained herein such that a go/no-go decision can be reached by early next year.

7629 (DOE/MC/27363–3870) **Tampa Electric Company Polk Power Station Unit Number 1. Annual report, January–December, 1993.** Tampa Electric Co., FL (United States). Aug 1994. 45p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FC21-91MC27363. Order Number DE95000042. Source: OSTI; NTIS; GPO Dep.

This report satisfies the requirements of Cooperative Agreement DE-FC21-91MC27363, novated as of March 5, 1992, to provide an annual update report on the year's activities associated with Tampa Electric Company's 250 MW IGCC demonstration project for the year 1993. Tampa Electric Company's Polk Power Station Unit 1 (PPS-1) Integrated Gasification Combined Cycle (IGCC) demonstration project will use a Texaco pressurized, oxygen-blown, entrained-flow coal gasifier to convert approximately 2,000 tons per day of coal (dry basis) coupled with a combined cycle power block to produce a net 250 MW electrical power output. Approximately 50% of the raw, hot syngas is cooled to 900 F and passed through a moving bed of zinc-based sorbent which removes sulfur containing compounds from the syngas. The remaining portion of the raw, hot syngas is cooled to 400 F for conventional acid gas removal. Sulfur-bearing compounds from both cleanup systems are sent to a conventional sulfuric acid plant to produce a marketable, high-purity sulfuric acid by-product. The cleaned medium-BTU syngas from these processes is routed to the combined cycle power generation system where it is mixed with air and burned in the combustion section of the combustion turbine. Heat is extracted from the expanded exhaust gases in a heat recovery steam generator (HRSG) to produce steam at three pressure levels for use throughout the integrated process. A highly modular, microprocessor-based distributed control system (DCS) is being developed to provide continuous and sequential control for most of the equipment on PPS-1.

7630 (DOE/PC/89663–T14) **Development of a coal quality expert. Technical progress report No. 16.** CQ, Inc., Homer City, PA (United States). 2 Aug 1994. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FC22-90PC89663. Order Number DE95005468. Source: OSTI; NTIS; GPO Dep.

This report covers the period from January 1 through March 31, 1994. Five companies and five host utilities have teamed with CQ Inc. and ABB/CE to perform the work on this project. The work falls under DOE's Clean Coal Technology Program category of "Advanced Coal Cleaning". The 51-month project will provide the utility industry with a PC software program to confidently and inexpensively evaluate the potential for coal cleaning, blending, and switching options to reduce emissions while producing lowest cost electricity. Specifically, this project will: (1) Enhance the existing Coal Quality Information System (CQIS) database and Coal Quality Impact Model (CQIM) to allow confident assessment of the effects of cleaning on specific boiler cost and performance; (2) Develop and validate a methodology, Coal Quality Expert (CQE), which allows accurate and detailed predictions of coal quality impacts on total power plant capital cost, operating cost, and performance based upon inputs from inexpensive bench-scale tests.

7631 (ETDE-DE–3) **Experts' opinion: Heat exchangers in power plant engineering. Pt. 1. Enhanced efficiency through the further development of heat exchanger technologies.** Forschungszentrum Juelich GmbH (Germany). Projekttraeger Biologie, Energie, Oekologie; Fichtner Development Engineering GmbH, Stuttgart (Germany). Apr 1992. 61p. (In German). Sponsored by Bundesministerium fuer Forschung und Technologie, Bonn (Germany). Foerderkennzeichen BMFT 0326746A. Order Number DE95738932. Source: OSTI; NTIS (US Sales Only).

An investigation into this subject must consider not only conventional power plant concepts but also innovative, coal-fired combined-cycle power plants, whose efficiency can be distinctly enhanced by increasing their upper process temperature. This involves, inter alia, higher demands on heat exchangers that conventional metal recuperators do not meet. The first of the expertise comprises the following tasks: - survey of heat exchangers at power stations, - description of the state of the art of such heat exchangers (technical specification, limits of use, list of manufacturers), - listing of those heat exchangers whose further development may result in higher efficiency. On the basis of the results of this first part of the expertise it was decided to investigate, in a second part, an innovative combined-cycle process with an indirectly coal-fired gas turbine. In this process the flue gas heat liberated by the combustion of coal is transferred to a clean medium used to operate a gas turbine. To ensure the efficiency of the gas turbine process this heat transfer must take place at temperatures far higher than 1000 C. As a consequence, demands on the heat exchanger are such as cannot be met by conventional engineering. Consequently, this high-temperature heat exchanger represents the central development target of the envisaged combined-cycle process with coal firing. (orig./GL)

7632 (STUK-YTO-TR–54) **Experience of reliability of programmable control systems.** Jaervinen, J. (Ekono Oy, Espoo (Finland)); Mikkanen, M.; Heimbuerger, H. Finnish Centre for Radiation and Nuclear Safety (STUK), Helsinki (Finland). 1993. 34p. (In Finnish). Order Number DE95737615. Source: OSTI; NTIS.

The automatic control system reliability project studied operational experience of the use of programmable control systems at six conventional power plants. The emphasis in the project was on the analysis and classification of failures occurred, the failure analysis and recording practice used at the plants and on the maintenance of the control system. Moreover, the frequency of plug-in unit faults was evaluated. These failures are usually investigated and corrected under the supervision of plant management. The maintenance of programmable automatic control systems is primarily corrective, that is, faults are corrected when they occur. There are few points which need preventive maintenance. The maintenance of the programs and modifications require personnel specialized in this kind of work. The need for modifications varies very much depending on how well the application has been designed. The automatic control systems at the plants studied caused very few disturbances to production. The redundancy guarantees that failures in individual equipment do not cause interruptions in production. However, faults in the design of the application and in the installation have occurred also after the Commissioning in most plants. On the basis of the study, it can be assessed that the integration of a control system with investment projects and design methods has a decisive role in achieving good results. Flexible and right-timed communication between process and automation designers and sufficient knowledge of processes are necessities for producing reliable systems.

2002 Waste Management

Refer also to citation(s) 7150, 7151, 7153, 7154, 7156, 7157, 7158, 7159, 7160, 7180, 7182, 8437

7633 (DOE/MC/28162–3951) **Coolside waste management research. Quarterly report, July 1, 1994–September 30, 1994.** Kentucky Univ., Lexington, KY (United States). Center for Applied Energy Research. 4 Nov 1994. 19p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC21-91MC28162. Order Number DE95005114. Source: OSTI; NTIS; GPO Dep.

The project objectives are to investigate the chemical and mineralogical and physical changes in fluidized-bed combustor (FBC)-waste pellets. In addition, the authors wish to understand the importance of hydration reactions on the long-term stability aspects of the pellets.

7634 (DOE/PC/91338–T8) **High SO_2 removal efficiency testing. Quarterly status report, April–June, 1994.** Blythe, G. Radian Corp., Austin, TX (United States). 27 Jul 1994. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-92PC91338. Order Number DE95005556. Source: OSTI; NTIS; GPO Dep.

The project involves testing at six full-scale utility flue gas desulfurization (FGD) systems to evaluate low capital cost upgrades that may allow these systems to achieve up to 98% SO_2 removal efficiency. The upgrades to be evaluated mostly involve using additives in the FGD systems. The "base" project involved testing at the Tampa Electric Company Big Bend station. All five potential options to the base program have been exercised by DOE involving testing at the Hoosier Energy Merom Station (Option 1), the Southwestern Electric Power Company Pirkey Station (Option 2), the PSI Energy Gibson Station (Option 3), the Duquesne Light Elrama Station (Option 4) and the New York State Electric and Gas Company Kintigh Station (Option 5). By the end of June 1994, testing was completed for the base project and for Options 1 through 4, and was just about to begin for Option 5. Section 2, Project Summary, provides a brief overview of the status of technical efforts on this project. Section 3, Results, summarizes the outcome from these technical efforts during the quarter. Section 4, Plans for the Next Reporting Period, provides an overview of the technical efforts that are anticipated for the third quarter of calendar year 1994.

7635 (DOE/PC/91344–T10) **Advanced separation technology for flue gas cleanup. Quarterly technical report No. 10.** Bhown, A.S. (SRI International, Menlo Park, CA (United States)); Alvarado, D.; Pakala, N.; Ventura, S.; Sirkar, K.K.; Majumdar, S.; Bhaumick, D. SRI International, Menlo Park, CA (United States). Nov 1994. 20p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-92PC91344. Order Number DE95006207. Source: OSTI; NTIS; GPO Dep.

Work was continued on Tasks 2, 4, 7 and 14 and on Task 8. Lifetime tests were carried out on d-DMA absorption/desorption capability for SO_2. The d-DMA capacity did not degrade upon repeated exposure to SO_2. Experiments were also run using Co(II)-phthalocyanine for NO_x absorption at 70°C. SO_2 removal was studied using 200 fiber hollow fiber contactor. Since wet scrubbing of SO_2 will be the first of the two absorption processes, the experiment was carried out to examine the influence of NO presence on SO_2 removal. It was demonstrated that 527 ppM of NO in feed gas did not affect the SO_2 removal rate. The results of mass transfer experiments at 500 and 1000 sccm flow rates are presented. Over 80 hrs of particle deposition operation, the mass transfer coefficients were observed to decrease by 20–30%. The reason for this decrease appears to be particle coating formation on the inner walls of the fiber. Preliminary economic evaluation was completed of the proposed technology. The capital costs are lower by more than a factor of two compared to widely used existing process. Also, the operating costs are shown to be lower compared to commonly employed scheme by using heat integration network.

7636 (FAAR–23/1993, pp. 99-104) **High temperature gas filtration.** Loeffler, F. (Univ. Karlsruhe (Germany). Inst. fuer Verfahrenstechnik und Mechanik). Finnish Association for Aerosol Research, Espoo (Finland). 1993. (CONF-9306401–: 5. Finnish national aerosol symposium, Espoo (Finland), 1-3 Jun 1993). In *Report series in aerosol science.* 292p. Order Number DE95737628. Source: OSTI; NTIS.

Particle separation at 'high temperatures' is a matter of interest and concern in many applications, e.g. power generation, waste incineration, combined gas and particle separation in many industrial processes. This presentation is confined to temperatures < 1000 deg C and will discuss some recent results and some open questions for further research regarding cyclones, granular beds and ceramic filters.

7637 (FAAR–23/1993, pp. 220-225) **Continuous method for coal fired power plant particle emission mass monitoring.** Valmari, S.T. (Technical Research Centre of Finland, Espoo (Finland). Aerosol Technology Group); Ahonen, P.P.; Joutsensaari, J.; Kauppinen, E.I.; Jokiniemi, J.K. Finnish Association for Aerosol Research, Espoo (Finland). 1993. (CONF-9306401–: 5. Finnish national aerosol symposium, Espoo (Finland), 1-3 Jun 1993). In *Report series in aerosol science.* 292p. Order Number DE95737628. Source: OSTI; NTIS.

In this study, a continuous monitoring system based on Tapered Element Oscillating Microbalance (TEOM) has been developed and tested in a real scale coal fired power plant. The particle mass concentration is measured with a Tapered Element Oscillating Micro- balance (TEOM) developed by Rupprecht and Patashnick Co., Inc. (Albany, NY, USA). The TEOM-based measurement system has been found suitable both for measuring concentration level and observing fast changes in concentration. Particle deposition in dilution system need to be determined in detail when accurate emission values are desired. Measuring of very low concentration (large dilution ratio) is affected by noise and by error in concentration due to evaporation of particles from TEOM-filter. A large noise makes it necessary to use longer data-averaging time. Accuracy of measurement and time resolution is better with a small dilution ratio, but the longest possible duration of measurement is then shorter. About 5 mg of particles can be collected to a TEOM-filter. The longest possible duration of measurement without changing the filter is about 1 day with one diluter and about 10 days with two diluters, if the mass concentration of the sample is 10 mg/m^3 and the flow rate to TEOM-monitor 5 l/min. Reducing the sample flow rate increases the measurement time. On the other hand, changing a TEOM-filter is a simple operation. Stabilization of TEOM-monitor after change of filter takes 1-2 hours.

7638 (NEI-DK–1764) **Membrane contactors to replace conventional scrubbers.** Brummerstedt Iversen, S. FLS Miljoe A/S, Valby (Denmark); Danmarks Ingenioerakademi, Lyngby (Denmark). Mar 1994. 170p. Contract ENS-1323/90-0026. Order Number DE95737525. Source: OSTI; NTIS.

EFP-90.

Conventional flue gas cleaning processes are characterized by huge space requirements and related high capital costs. Recent studies on membrane contactors have shown that the contactor volume can be reduced considerably due to the high packing density in this contactor type. This dissertation describes an experimental and theoretical study of the possibilities for replacing conventional scrubbers for flue gas desulfurization by membrane contactors. Three major tasks are critical for development of the membrane based flue gas cleaning process: the membrane, the module design and the process design. A comprehensive study for characterisation of microporous membranes for use in membrane contactors has been carried out in the laboratory. The effect of membrane parameters have been investigated for a wide variety of hydrophobic, microporous membranes in both flat sheet and hollow fibre form. The investigation was performed by SO_2 diffusivity experiments, N_2- and water permeability experiments, and measurements of NaCl diffusivity through prewetted membranes. Additional information about the pore structures of the flat membranes was obtained from scanning electron microscope photos and measurements of the bubble point pressure. The performance and economics of a membrane contactor flue gas desulfurization process with electrodialytic regeneration of the spent absorbent solution (MCED process) has been evaluated and compared with conventional flue gas desulfurization processes. The basis for the comparison is 96.5% SO_2 removal from a 500 MW power plant

burning high sulfur coal. The analysis shows that the MCED process will be highly competitive with the conventional flue gas desulfurization processes. For the best hollow fibre available today, the projected capital costs is about 30% lower than the limestone process with on-site byproduct disposal. (EG)

7639 (NEI-DK–1774) **Optimized construction and use of flue-gas heat exchangers in the large natural gas fueled boilers.** Energiministeriets Forskningsudvalg for produktion og fordeling af el og varme. Braendsler og forbraendingsteknik. Moeller, S. Dansk Teknologisk Inst., Taastrup (Denmark); Krueger (I.) A/S, Copenhagen (Denmark). Sep 1994. 60p. (In Danish). Contract EM-1433/86-14. Order Number DE95737569. Source: OSTI; NTIS.

EFP-86.

The Danish Technological Institute and I. Krueger A/S have cooperated in developing a computer program MODS, to compute condensing flue gas coolers. The computer program focuses on the computation of crossflow/counterflow heat exchangers, and certain adjustments and manual calculations are required in order to use the program on flue gas coolers with parallel flow or parallel flow/counterflow coupling section by section. The computer program computes performance and temperature data, amount of condensate and pressure loss in connection with complete or partial condensing flue gas cooling. Through laboratory tests it has been demonstrated that the measured values are in keeping with the computed values within an average uncertainty margin of approx. 8% with regard to the determination of output while full-scale plant measurements have shown somewhat larger discrepancies between the measured values and the computed data. The computer program must be partly reconstructed and adjusted to try to achieve better agreement between measured and computed values. The computer program can with advantage be upgraded to be able to handle an arbitrary coupling variant (parallel/counterflow). (au)

7640 (VTT-TIED–1445) **Usability of catalytic gas cleaning in a simplified IGCC power system. Deactivation of Ni/Al_2O_3 catalysts. Literature review.** Hepola, J. (Technical Research Centre of Finland, Espoo (Finland). Lab. of Fuel and Process Technology). Technical Research Centre of Finland, Espoo (Finland). 1993. 80p. Order Number DE95737600. Source: OSTI; NTIS.

Nickel-based catalysts have proven to be efficient for tar and ammonia decomposition in laboratory scale gas purification experiments, in which biomass, peat and coal gasification was applied. A potential location for a separate catalyst reactor for an IGCC process using biomass gas derived from a fluidized-bed gasifier is downstream of cyclones before the ceramic filter unit. Complex nature of biomass and peat gas cannot be simulated completely in the laboratory. Long-term tests using a gas stream from an operating gasifier are likely the best way to test catalyst deactivation. Catalyst deactivation may be chemical, mechanical or thermal. Poisoning, fouling, thermal degradation and vaporization are the four intrinsic mechanisms. Poisoning and thermal degradation are generally slow and irreversible; fouling with coke and carbon is rapid but easily reversed by gasification. Loss of metals by vaporization is completely irreversible. Deactivation is more easily prevented than cured. Poisoning by impurities may be prevented by purifying the reactants. Carbon deposition and coking may be prevented by minimizing formation of precursors and by manipulating mass-transfer regimes to minimize the effect of carbon or coke on activity. Sintering is avoided by operating at a low temperature. The catalyst should also have a sufficient mechanical strength so that it does not dust or crack while in operation. Thermodynamic calculations showed that in the process conditions likely to be used in the catalytic cleaning unit, nickel oxide is reduced to metallic nickel, carbon (graphite) and nickel sulphide is formed depending on the temperature, pressure and the gas composition of the process. The higher the pressure the more probable is the formation of carbon and nickel sulphide. The probability for carbon formation decreases when the moisture content of the gas increases.

21 NUCLEAR POWER REACTORS AND ASSOCIATED PLANTS

Refer also to citation(s) 7714, 7716, 7731, 7739, 7740, 7741, 7742, 7743, 7745, 7746

7641 (IAEA-TECDOC–769, pp. 47-54) **Application of neural networks in nuclear safety analysis.** Stritar, A. (Jozef Stefan Inst., Ljubljana (Slovenia)); Leskovar, M. International Atomic Energy Agency, Vienna (Austria). Oct 1994. (CONF-9310404–: Specialists meeting on current practices and future trends in expert system developments for use in the nuclear industry, Tel Aviv (Israel), 11-15 Oct 1993). In *Current practices and future trends in expert system developments for use in the nuclear industry. Report of a specialists meeting held in Tel Aviv, Israel, 11-15 October 1993.* 147p. Order Number DE95615814. Source: OSTI; NTIS (US Sales Only); INIS.

Two applications of the neural network methodology in the field of nuclear safety analysis are described. The first one is the 3-D response surface generation by the Back Propagation Method. The results were not satisfactory. The second is the application of the Optimal Statistical Estimator methodology for the generation of 8-D response surface. It was used as a statistical part of the Code, Scaling, Applicability and Uncertainty (CSAU) methodology for the evaluation of Large Break Loss of Coolant Accident. The result was comparable to the one obtained by the ordinary method. (author). 24 refs, 5 figs, 3 tabs.

7642 (IAEA-TECDOC–769, pp. 123-136) **Representation of topological and functional-logical knowledge in an expert system for probabilistic safety analysis.** Kosmowski, K.T. (Technical Univ. of Gdansk, Gdansk (Poland)); Duzinkiewicz, K.; Jackowiak, M.; Szczesniak, J. International Atomic Energy Agency, Vienna (Austria). Oct 1994. (CONF-9310404–: Specialists meeting on current practices and future trends in expert system developments for use in the nuclear industry, Tel Aviv (Israel), 11-15 Oct 1993). In *Current practices and future trends in expert system developments for use in the nuclear industry. Report of a specialists meeting held in Tel Aviv, Israel, 11-15 October 1993.* 147p. Order Number DE95615814. Source: OSTI; NTIS (US Sales Only); INIS.

This paper is devoted to the representation of knowledge in an expert system REPSA1ES (Reliability Evaluation and Probabilistic Safety Analysis - level 1 - Expert System). The prototype system has been designed to facilitate the probabilistic safety analysis (PSA) of complex hazardous industrial systems and to support safety oriented decision making during the design phase and operation of process systems. Taking into account known difficulties to manage complexity of logical and probabilistic modelling of nuclear power plants using the conventional PSA software packages we decided to represent information in a graphical form, whenever it is justified, and to automate the process of coding of objects to avoid errors. The software system consists of a CAD package, data bases, a shell for building expert system and several software modules to enable: the effective communication with the user, data and knowledge acquisition, the initiation of inferring to support logical modelling of the plant, selection of reliability models with input parameters as well as the quantitative probabilistic evaluation of accident scenarios. (author). 33 refs, 7 figs, 1 tab.

7643 (INIS-mf–14434) **Safety assessment principles for nuclear plants.** Bezpecnost Jadernych Zarizeni, no.3. Statni Urad pro Jadernou Bezpecnost, Prague (Czech Republic). 1994. 52p. Translation of Safety assessment principles for nuclear plants, HMSO Publication Centre, London, 1992; Original submitted to the INIS database under reference number 25:025828. (In Czech). Order Number DE95612832. Source: OSTI; NTIS (US Sales Only); INIS.

Given are 333 nuclear power plant safety principles. The basic principles require that (i) during normal plant operation, no individual shall be exposed to ionizing radiation doses exceeding specified dose limits; (ii) exposure of any individual shall be kept as low as reasonably achievable; (iii) the collective effective dose equivalent for professionals and the public shall be kept as low as reasonably achievable; (iv) all reasonable provisions to prevent accidents shall

be adopted; and (v) all reasonable measures shall be taken to minimize radiological consequences of accidents. The remaining principles are aimed at securing adherence to the basic principles during nuclear power plant commissioning and start-up. (J.B.).

7644 (PINSTECH–129) **Development of PC-based FFT system for reactor dynamic analysis.** Ansari, S. (Pakistan Inst. of Nuclear Science and Technology, Islamabad (Pakistan). Nuclear Engineering Div.); Baig, A.R. Pakistan Inst. of Nuclear Science and Technology, Islamabad (Pakistan). Nuclear Engineering Div. Mar 1993. 18p. Order Number DE95615899. Source: OSTI; NTIS (US Sales Only); INIS.

5 fig.

A personal computer based fast fourier transform (FFT) analyzer has been developed for frequency spectrum analysis of signals from nuclear reactor. The system can perform window smoothing, computation of auto- and cross-power spectral density, coherence and auto and cross-correlation functions. The feature of 16 analogue signals acquisition with high precision and high sampling frequency makes the analyzer suitable for malfunction diagnosis of nuclear reactors using reactor noise analysis. The development work for the fourier analyzer was undertaken as a part of IAEA research contract no. 5925/RB. The applications of the FFT analyzer are described in reactor transfer function measurements and nuclear instrumentation channels frequency response testing. (author). 5 fig.

2101 Power Reactors, Nonbreeding, Light-Water Moderated, Boiling Water Cooled

Refer also to citation(s) 7744, 7788, 7793, 7798, 7802, 7803, 7807, 7812, 7813, 7814, 7817, 7819

7645 (IAEA-TECDOC–769, pp. 87-91) **Development of a nuclear fuel reload pattern design system based on heuristic search methods.** Francois, J.L. (Instituto de Investigaciones Electricas, Cuernavaca (Mexico)); Martin Campo, C. del; Cortes, C.; Arellano, J.; Galicia, Y.; Ramirez, E. International Atomic Energy Agency, Vienna (Austria). Oct 1994. (CONF-9310404–: Specialists meeting on current practices and future trends in expert system developments for use in the nuclear industry, Tel Aviv (Israel), 11-15 Oct 1993). In *Current practices and future trends in expert system developments for use in the nuclear industry. Report of a specialists meeting held in Tel Aviv, Israel, 11-15 October 1993.* 147p. Order Number DE95615814. Source: OSTI; NTIS (US Sales Only); INIS.

The design of nuclear reactor fuel reload patterns involves a great amount of data, calculations, safety criteria and restrictions to be observed, as well as the knowledge of experts working in this field. Many reload patterns can be generated but only a few are optimal. In this paper the current development stage of a system based on heuristic search methods to generate and optimize fuel reload patterns using engineers is presented. The main components of the system are the knowledge base, the inference engine, the 3D Boiling Water Reactor (BWR) simulator PRESTO and the user interface. The system has already developed and evaluated fuel reload patterns for the Laguna Verde Nuclear Power Plant, achieving similar patterns to those generated by the fuel supplier. Further work on optimization of patterns is about to be started. In the near future this system will be integrated in an overall system based on graphics environment to perform in-core fuel management analysis for BWR nuclear reactors. (author). 2 refs.

7646 (INIS-mf–14440, pp. 4-5) **The boiling water reactor transfer function studies by non-linear dynamical equations.** Ghasemi Zaad, A.; Eskandari, M. Iranian Physics Society, Teheran (Iran, Islamic Republic of); Shiraz Univ. (Iran, Islamic Republic of). Dept. of Physics. Aug 1994. 91p. (In English, Persian). (CONF-9408203–: Annual physics conference of Iran, Sanandaj (Iran, Islamic Republic of), 19 Aug - 1 sep 1994). In *Abstracts of annual physics conference of Iran, 1373 Kordestan University.* Order Number DE95611717. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. BWR TYPE REACTORS/nonlinear problems; BWR TYPE REACTORS/transfer functions; BIFURCATION; RUNGE-KUTTA METHOD

7647 (NEI-SE–183) **Decommissioning of Swedish nuclear power reactors. Technology and costs.** Swedish Nuclear Fuel and Waste Management Co., Stockholm (Sweden). Jun 1994. 78p. (In Swedish). Order Number DE95615903. Source: OSTI; NTIS; INIS.

The main topics discussed are planning, technology and costs of decommissioning nuclear power reactors. Oskarshamn-3 (BWR) and Ringhals-4 (PWR) have been used as reference reactors. 29 refs, figs, tabs.

7648 (NUREG/CR–6214) **Production and testing of the VITAMIN-B6 fine group and the BUGLE-93 broad-group neutron/photon cross-section libraries derived from ENDF/B-VI nuclear data.** Ingersoll, D.T. (Nuclear Regulatory Commission, Washington, DC (United States)); White, J.E.; Wright, R.Q.; Hunter, H.T.; Slater, C.O.; Greene, N.M.; Roussin, R.W.; MacFarlane, R.E. Nuclear Regulatory Commission, Washington, DC (United States). Div. of Engineering Technology; Oak Ridge National Lab., TN (United States). Jan 1995. 167p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). (ORNL–6795). Source: OSTI; NTIS; GPO; INIS.

A new multigroup cross-section library based on ENDF/B-VI data has been produced and tested for light water reactor shielding and reactor pressure vessel dosimetry applications. The broad-group library, which is designated BUGLE-93, is intended to replace the aging BUGLE-80 and SAILOR libraries. The processing methodology is consistent with ANSI/ANS 6.1.2, since the ENDF data were first processed into a fine-group, pseudo-problem-independent format and then collapsed into the final broad-group format. The fine-group library, which is designated VITAMIN-B6, contains 120 nuclides. The BUGLE-93 47-neutron-group/20-gamma-ray-group library contains the same 120 nuclides processed as infinitely dilute and collapsed using a weighing spectrum typical of a concrete shield. Additionally, BUGLE-93 contains 105 nuclides processed with resonance self-shielding and weighted using spectra specific to BWR and PWR material compositions and reactor models. Several dosimetry response functions and kerma factors for all 120 nuclides are also included with the library. An extensive integral data testing effort was performed to qualify the new library. In general, results using the new data show significant improvements relative to earlier ENDF data.

7649 (SAND–94-2163) **Core damage frequency observations and insights of LWRs based on the IPEs.** Dingman, S.E. (Sandia National Labs., Albuquerque, NM (United States)); Camp, A.L.; Drouin, M.T.; Kolaczkowski, A.; Darby, J.; LaChance, J.L.; Yakle, J. Sandia National Labs., Albuquerque, NM (United States). [1995]. 13p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). DOE Contract AC04-94AL85000. (CONF-9410216–2: 22. transactions of the water reactor safety information meeting, Bethesda, MD (United States), 24-26 Oct 1994). Order Number DE95004726. Source: OSTI; NTIS; INIS; GPO Dep.

Seventy-eight plants are expected to submit Individual Plant Examinations (IPEs) for severe accident vulnerabilities to the U.S. Nuclear Regulatory Commission (NRC). The majority of the plants have elected to perform full Level 1 probabilistic risk assessments (PRAs) to meet the intent of the IPES. Because of this, it is possible to compare the results from the IPE submittals to determine general observations and "lessons learned" from the IPES. The IPE Insights Program is performing this evaluation, and preliminary results are presented in this paper. The core damage frequency and core damage sequences are identified and compared for pressurized water reactors and boiling water reactors. Examination of the results indicates that variations among plant results are due to a combination of actual plant design/operational features and analysis approaches. The findings are consistent with previous NRC studies, such as WASH-1400 and NUREG-1 150.

7650 (SAND–94-2170C) **Risk contribution from low power, shutdown, and other operational modes beyond full power.** Whitehead, D.W.; Brown, T.D.; Chu, T.L.; Pratt, W.T. Sandia National Labs., Albuquerque, NM (United States); Brooklyn Coll., NY (United States). Dept. of Chemistry. [1995]. 25p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). DOE Contract AC04-94AL85000 ; AC02-76CH00016. (CONF-9410216–3: 22. transactions of the water reactor safety information

meeting, Bethesda, MD (United States), 24-26 Oct 1994). Order Number DE95004727. Source: OSTI; NTIS; INIS; GPO Dep.

During 1989 the Nuclear Regulatory Commission (NRC) initiated an extensive program to carefully examine the potential risks during low power and shutdown operations. Two plants, Surry (a pressurized water reactor) and Grand Gulf (a boiling water reactor), were selected for study by Brookhaven National Laboratory and Sandia National Laboratories, respectively. The program objectives included assessing the risks of severe accidents initiated during plant operational states other than full power and comparing estimated core damage frequencies, important accident sequences, and other qualitative and quantitative results with full power accidents as assessed in NUREG-1150. The scope included a Level 3 probabilistic risk assessment (PRA) for traditional internal events and a Level 1 PRA on fire, flooding, and seismically induced core damage sequences. A phased approach was used in Level 1. In Phase 1 the concept of plant operational states (POSs) was developed to provide a better representation of the plant as it transitions from power to nonpower operation. This included a coarse screening analysis of all POSs to identify vulnerable plant configurations, to characterize (on a high, medium, or low basis) potential frequencies of core damage accidents, and to provide a foundation for a detailed Phase 2 analysis. In Phase 2, selected POSs from both Grand Gulf and Surry were chosen for detailed analysis. For Grand Gulf, POS 5 (approximately cold shutdown as defined by Grand Gulf Technical Specifications) during a refueling outage was selected. For Surry, three POSs representing the time the plant spends in midloop operation were chosen for analysis. These included POS 6 and POS 10 of a refueling outage and POS 6 of a drained maintenance outage. Level 1 and Level 2/3 results from both the Surry and Grand Gulf analyses are presented.

2102 Power Reactors, Nonbreeding, Light-Water Moderated, Nonboiling Water Cooled

Refer also to citation(s) 7647, 7648, 7649, 7650, 7668, 7672, 7683, 7711, 7712, 7713, 7718, 7719, 7721, 7729, 7730, 7732, 7734, 7749, 7752, 7787, 7788, 7789, 7790, 7793, 7794, 7795, 7796, 7797, 7798, 7799, 7800, 7801, 7802, 7803, 7804, 7805, 7806, 7807, 7809, 7810, 7811, 7812, 7813, 7814, 7815, 7817, 7819, 9169, 9171, 9172

7651 (CNIC–00769) **Post accident core damage assessment methodology and code.** He Zhongliang (Shanghai Nuclear Engineering Research and Development Inst., SH (China)); Zhao Shu. China Nuclear Information Centre, Beijing, BJ (China). Jun 1993. 15p. (In Chinese). (SNERDI–0021.). Order Number DE95612847. Source: OSTI; NTIS (US Sales Only); INIS.

Post accident core damage assessment methodology is a part of nuclear power plant emergency plan. It is used to assess core damage states and extents after an accident. Core damage states include no core damage, fuel clad failure, fuel overheat and fuel melt. The methodology consists of detailed assessment based on sampling system and primary assessment based on on-line monitoring system. A few aspects in post accident core damage assessment methodology developed by Westinghouse in 1984 were improved, such as introducing a modification factor related to fuel burnup and some other factors related to fission product retention on the surfaces of RCS (reactor coolant system) using research results about severe accidents. The methodology and the developed computer code have already been used in Qinshan NPP (nuclear power plant) and can also be used in other PWR (pressurized water reactor) NPPs.

7652 (DOE/SF/19090–T3) **Advanced light water reactor plants system 80+™ design certification program. Annual progress report, October 1, 1993–September 30, 1994.** Combustion Engineering, Inc., Windsor, CT (United States). [1995]. 66p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-91SF19090. Order Number DE95005458. Source: OSTI; NTIS; GPO Dep.

The purpose of this report is to provide a status of the progress that was made towards Design Certification of System 80+™ during the U.S. government's 1994 fiscal year. The System 80+ Advanced Light Water Reactor (ALWR) is a 3931 MW (1350 MWe) Pressurized Water Reactor (PWR). The design covers an essentially complete plant. It is based on EPRI ALWR Utility Requirements Document (URD) improvements to the Standardized System 80 Nuclear Steam Supply System (NSSS) in operation at Palo Verde Units 1, 2 and 3. The NSSS is a traditional two-loop arrangement with two steam generators, two hot legs and four cold legs, each with a reactor coolant pump. The System 80+ standard design houses the NSSS in a spherical steel containment vessel which is enclosed in a concrete shield building, thus providing the safety advantages of a dual barrier to radioactivity release. Other major features include an all-digital, human-factors-engineered control room, an alternate electrical AC power source, an In-Containment Refueling Water Storage Tank (IRWST), and plant arrangements providing complete separation of redundant trains in safety systems. Some design enhancements incorporated in the System 80+ design are included in the four units currently under construction in the Republic of Korea. These units and the System 80+ design form the basis of the Korean standardization program. The Nuclear Island portion of the System 80+ standard design has also been offered to the Republic of China, in response to their bid specification for an ALWR. The ABB-CE Standard Safety Analysis Report (CESSAR-DC) was docketed by the Nuclear Regulatory Commission (NRC) in May 1991 and a Draft Safety Evaluation Report (DSER) was issued in October 1992.

7653 (IAEA-TECDOC–773) **The safety of WWER and RBMK nuclear power plants. Progress report on the IAEA extrabudgetary programme on the safety of WWER and RBMK nuclear power plants, 1992-1994.** International Atomic Energy Agency, Vienna (Austria). Nov 1994. 102p. Order Number DE95615911. Source: OSTI; NTIS (US Sales Only); INIS.

This report, prepared by the IAEA secretariat, provides an overview of the IAEA Extrabudgetary Programme activities and results from 1992 until June 1994. The report describes the scope, the current status of the implementation and major findings and recommendations of the Programme. Though this report concentrates on the results of the Extrabudgetary Programme, it also refers to the significant related activities carried out under IAEA Technical Co-operation projects, as well as other international activities relevant to the safety of WWER and RBMK reactors. 13 figs, 9 tabs.

7654 (INIS-mf–14417) **Simulation of pressurized water reactor in accidental state.** Chakir, E. Universite Mohammed 5, Rabat (Morocco). Faculte des Sciences. 12 Apr 1994. 160p. (In French). Order Number DE95615912. Source: OSTI; NTIS (US Sales Only); INIS.

The aim of this work is to develop the 1300 MWe 4 loops 'PWR' simulator called 'SATRAPE', witch the adopted physics modelisation allows a simplified neutronic calculation, and focus essentially on the reactor thermal hydraulic behavior in the case of the following accidents: - Loss of Coolant Accident (LOCA). - Steam Generator Tube Failure (SGTF). - Steam Line Break (SLB). In case of the 'LOCA' or 'SLB' accident, this modelisation enables the calculation of the pressure and the temperature in the containment building, and also the debit of the released dose in this latter in case of the 'LOCA' accident. The adopted models are relatively simple so as to allow an explicit resolve. In SATRAPE, two graphical interfaces enables to launch orders, whereas the other permits to visualize, the principal state variables of installations. The results obtained show a very good consistency with the envisaged commonly scenario at the time of the considered accidents. 33 refs., 52 figs., 1 tab. (author).

7655 (KAERI/RR–1222/93) **Development of standard logic network for PWR NSSS system design.** Chung, Moon Kyu (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Lee, Byeong Ryeong; Lee, Pan Kwon; Lee, Hae Joon; Park, Joon Won; Song, Tae Gil; Kim, Dong Hui; Choi, Hyeon Ho. Korea Cancer Center Hospital, Seoul (Korea, Republic of). May 1993. 19p. (In Korean). Order Number DE95612848. Source: OSTI; NTIS; INIS.

The self-reliance of NSSS System Design is required not only the design capability to perform the system design but also the management capability to control the resource and time for the Project effectively. The purpose of this study is to develop the simplified standard Logic Network that is scheduled on the time and

resource using the PERT/CPM method. That is mainly focused on Ulchin 3, 4 Project. We prepare the management tool of NSSS System Design project. And we can utilize it as a reference tool for the similar project which are complex and long term in a next project. (Author).

7656 (KAERI/RR–1224/93) **Research on the improvement of nuclear safety.** Yoo, Keon Joong (and others); Kim, Dong Soo; Kim, Hui Dong; Park, Chang Kyu. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jun 1993. 77p. (In Korean). Order Number DE95612849. Source: OSTI; NTIS; INIS.

To improve the nuclear safety, this project is divided into three areas which are the development of safety analysis technology, the development of severe accident analysis technology and the development of integrated safety assessment technology. 1. The development of safety analysis technology. The present research aims at the development of necessary technologies for nuclear safety analysis in Korea. Establishment of the safety analysis technologies enables to reduce the expenditure both by eliminating excessive conservatisms incorporated in nuclear reactor design and by increasing safety margins in operation. It also contributes to improving plant safety through realistic analyses of the Emergency Operating Procedures (EOP). 2. The development of severe accident analysis technology. By the computer codes (MELCOR and CONTAIN), the in-vessel and the ex-vessel severe accident phenomena are simulated. 3. The development of integrated safety assessment technology. In the development of integrated safety assessment techniques, the included research areas are the improvement of PSA computer codes, the basic study on the methodology for human reliability analysis (HRA) and common cause failure (CCF). For the development of the level 2 PSA computer code, the basic research for the interface between level 1 and 2 PSA, the methodology for the treatment of containment event tree are performed. Also the new technologies such as artificial intelligence, object-oriented programming techniques are used for the improvement of computer code and the assessment techniques.

7657 (KAERI/RR–1239/92) **The development of integrated safety assessment technology.** Yoo, Keon Joong (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Park, Chang Kyu; Kim, Tae Un; Han, Sang Hoon; Yang, Joon Eon; Lim, Tae Jin; Han, Jae Joo; Je, Moo Seong; An, Kwang Il; Kim, Shi Dal; Jeong, Jong Tae; Jeong, Kwang Seop; Jin, YeoKorea Cancer Center Hospital, Seoul (Korea, Republic of). May 1993. 146p. (In Korean). Order Number DE95612850. Source: OSTI; NTIS; INIS.

For the purpose of developing the integrated PSA methodology and computer codes, Level-1 and Level-2 PSA methodology and tools were reviewed and improved. The Level-1 PSA computer code package KIRAP was improved and released by the name of KIRAP Release 2.0 Several Human reliability analysis and common cause failure analysis methods was reviewed and compared. For the development of Level-2 PSA computer code, several level-1 and Level-2 interface methods and containment event tree development methods were reviewed and compared. And the new technology such as artificial intelligence was reviewed if the technology can be applied to the development of PSA methodology.(Author).

7658 (KAERI/RR–1240/92) **Development of Megawatt Demand Setter for Plant Operating Flexibility.** Kim, Se Chang (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Hah, Yeong Joon; Song, In Ho; Lee, Myeong Hun; Chang, Do Ik; Choi, Jung In. Korea Cancer Center Hospital, Seoul (Korea, Republic of). May 1993. 49p. (In Korean). Order Number DE95612851. Source: OSTI; NTIS; INIS.

The Conceptual design of the Megawatt Demand Setter (MDS) is presented for the Korean Standardized Nuclear Power Plant. The MDS is a digital supervisory limitation system. The MDS assures that the plant does not exceed the operating limits by regulating the plant operations through monitoring the operating margins of the critical parameters. MDS is aimed at increasing the operating flexibility which allow the nuclear plant to meet the grid demand in very efficient manner. It responds to the grid demand without penalizing plant availability by limiting the load demand when the operating limits are approached or violated. MDS design concepts were tested using simulation responses of Yonggwang Units 3, 4. The design of the Yonggwang Units 3, 4 would be used as a reference which designs of Korean Standardized Nuclear Power Plants would be based upon. The simulation results illustrate that the MDS can be used to improve operating flexibility. (Author).

7659 (KAERI/RR–1266/93) **Development of debris resistant bottom end piece.** Lee, Jae Kyung (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Sohn, Dong Seong; Yim, Jeong Sik; Hwang, Dae Hyun; Song, Kee Nam; Oh, Dong Seok; Rhu, Ho Sik; Lee, Chang Woo; Kim, Seong Soo; Oh, Jong Myung. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Dec 1993. 323p. (In Korean). Order Number DE95612853. Source: OSTI; NTIS; INIS.

Debris-related fuel failures have been identified as one of the major causes of fuel failures. In order to reduce the possibility of debris-related fuel failures, it is necessary to develop Debris-Resistant Bottom End Piece. For this development, mechanical strength test and pressure drop test were performed, and the test results were analyzed. And the laser cutting, laser welding and electron beam welding technology, which were the core manufacturing technology of DRBEP, were developed. Final design were performed, and the final drawing and specifications were prepared. The prototype of DRBEP was manufactured according to the developed munufacturing procedure. (Author).

7660 (KAERI/RR–1270/93) **Development of detection technique for fatigue crack due to thermal stratification phenomena in RCS piping.** Lee, Sam Lai (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Kim, Byoung Chul; Hong, Soon Shin; Park, Chi Sung; Lee Jong Po; Chang, Kee Ok. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Dec 1993. 127p. (In Korean). Order Number DE95612854. Source: OSTI; NTIS; INIS.

Primitive experiment was performed to make thermal fatigue specimen using Argon gas torch as a fundamental work and permanent test-loop for automatic heat-up and cool-down was designed in order to manufacture thermal fatigue specimen. As for the development of detection technique, work was performed to build up a procedure to detect and size fatigue cracks with all currently available ultrasonic testing technique using natural cracked blocks which were made during previous years. Since the final object of this project is to detect fine cracks such as fatigue cracks, one of signal processing techniques which play a great role to improve signal to noise ratio was adopted with the software that was previously developed. (Author).

7661 (KAERI/RR–1295/93) **A study on the computerization of secondary side on-line chemistry monitoring system of PWR.** Yang, Kyung Rin (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Hong, Kwang Bum; Lee, Eun Hee. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Dec 1993. 102p. (In Korean). Order Number DE95612855. Source: OSTI; NTIS; INIS.

A computer system for on-line chemistry monitoring system located in secondary side of PWR plant is under developing. Keithley 500A Mainframe and AMM1A and AIM3A modules are used for data acquisition and scientific and engineering software package of ASYST is used for developing software program. The contents are as follows; (1) Data Acquisition and Real-Time Display. The output signals of monitoring chemical sensors are stored in PC showing real-time data display as true values and graphics. (2) Data Management and Trending Graphs. The data stored in PC are outcoming in various graphic mode for data management such as simple trending graphs screen display, time duration plot and histogram plot. (3) Daily Basis Data Manual Input. The chemical analysis data of grab sample are stored in PC by manual input for supplemental data. (4) Tabular Data Report Preparation. Summarized daily, weekly, monthly, quarterly and yearly reports are prepared with various mode of graphic display. (Author).

7662 (KAERI/RR–1296/93) **Upgrade of one-dimensional core simulator ONED90.** Chang, Jong Hwa (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Cho, Young Sik; Zee, Syung Quun; Lee, Chang Ho; Lee, Ki Bok; Cho, Young Cherl; Choi, Young Gil; Kim, Hee Kyung. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Feb 1994. 81p. (In Korean). Order Number DE95612856. Source: OSTI; NTIS; INIS.

ONED90 is a computer program to simulate the nuclear core transient in terms of operational transient. It simulates mainly xenon transient which occurs with time step of 10 to 20 minutes during 3 to 4 days. To predict core state with accuracy, the power adaptation method, control rod adaptation method are employed. After tuning initial core condition ONED90 predicts core state with great accuracy. This report describes the Nodal Expansion Method, adjoint flux calculation method, equilibrium xenon concentration calculation method to improve accuracy, and Graphic User Interface for ease of end user. This report also mentions about the verification of ONED90 against the steady and transient core state. (Author).

7663 (KAERI/RR–1303/93) **Thermal-Hydraulics of a steam discharge system.** Sim, Yoon Sub (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); So, Dong Sup; Yoo, Geun Jong; Kim, Seong Oh; Kim, Yeon Sik; Chung, Se Won; Jung, Seung Ho; Park, Jin Ho. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Dec 1993. 135p. (In Korean). Order Number DE95612857. Source: OSTI; NTIS; INIS.

Physical characteristics of the steam discharge system of PWR, which consists of valves, piping, steam sparger, and steam accomodating tank, have been analyzed and a preliminary analysis system has been set up for development of the analysis and design methodology for the system. The work was the results of the second year research in the planned research period of four years. Analysis has been made for the characteristics of rapid transient and steady flow in the piping, steam condensation, small and hermetically sealed tank performance, bubble behavior and wall pressure oscillation in a large and open tank, coupling between wall pressure oscillation and structure vibration. Based on the analysis results, conceptual methods for controlling the hydraulic load on the wall have been devised and evaluated. (Author).

7664 (KAERI/RR–1314/93) **The development of LOCA analysis codes for nuclear power plant.** Chang, Won Pyo (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Kim, Dong Soo; Chung, Yeong Jong; Chang, Byeong Hoon; Park, Chan Eok; Guen, Tae Soon; Jeang, Jae Joon; Kim, Won Seok; Kim, Kyong Doo; Yoon, Joo Heon; Lee, Sang Yong; Chung, Beop.Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jul 1994. 266p. (In Korean). Order Number DE95612858. Source: OSTI; NTIS; INIS.

This research aims at assessment of the best-estimate codes, so as to develop a reliable analysis method for their actual applications. There are two additional purposes in the study: The first is the development of methodology for sizing the safety systems for advanced reactor design using the best-estimate codes, and the other is the development of our own best-estimate methodology, referring to USNRC approval of the acceptance criteria for ECCS based on the best-estimate method. The use of the best-estimate codes as those assumed in FSAR by only input arrangement, has resulted in achievement of at least 250 K safety margin. The fact that the predicted PCT in LBLOCA analysis is well bounded within the acceptance criteria using the best-estimates codes, should be verified by the quantification of the code uncertainty in the future. In the case of computer code improvement, the reflood models have been improved and satisfactory results have been obtained. In the case of uncertainty evaluation, the calculational matrices based on the assessment of experiments with the improved RELAP5 code for the quantification of the code uncertainty have been formulated separately for blowdown and reflood phases. (Author).

7665 (KAERI/RR–1316/93) **A study on the establishment of severe accident experimental facility.** Yoo, Kun Joong (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Kim, Sang Baek; Kim, In Sik; Nho, Ki Man; Bark, Rae Joon; Park, Chun Kyeong; Sim, Seok Koo; Lee, Seong Jae; Chung, Moon Ki; Cho, Yeong Ro; Chun, Shee Yeong. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jul 1994. 266p. (In Korean). Order Number DE95612859. Source: OSTI; NTIS; INIS.

Significant progress has been achieved during this year of the project. Planned DCH experiments on the sensitivity of the cavity geometry factors and the cavity capture volume effects were performed using the HPME facility for Kori-1/2 and YGN-3/4 cavity scale models. The Crust Formation Test Facility has been completed. Preliminary calculations were performed to predict test results. The experiments of the crust formation on the simulant and its heat transfer characteristic were performed to investigate the effects of coolant injection methods, bottom heating boundary surface temperatures, coolant temperatures and coolant flow rates. The design of the FCI Test Facility has been completed and the procurement of the materials is in progress. Also, the steam condensation experiment on the vertical containment walls and the research on the development of measuring techniques of the particle sizes and velocities are in progress as planned. Through international research collaboration with USNRC and CEA Cadarache, information of the experimental research on the severe fuel damage has been gathered and analyzed. Preliminary planning of the second phase tests has been launched this year. This study proposes the scope of the second phase and the strategy to implement the proposed second phase experimental program. This study also proposes a strategy to establish building blocks and infrastructure for the severe accident research in Korea. (Author).

7666 (WHC-SD-SNF-PTR–001) **Evaluation of storing Shippingport Core II spent blanket fuel assemblies in the T Plant PWR Core II fuel pool without active cooling.** Gilbert, E.R. (Pacific Northwest Lab., Richland, WA (United States)); Lanning, D.D.; Dana, C.M.; Hedengren, D.C. Westinghouse Hanford Co., Richland, WA (United States). Oct 1994. 66p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95004788. Source: OSTI; NTIS; INIS; GPO Dep.

PWR Core II fuel pool chiller-off test was conducted because it appeared possible that acceptable pool-water temperatures could be maintained without operating the chillers, thus saving hundreds of thousands of dollars in maintenance and replacement costs. Test results showed that the water-cooling capability is no longer needed to maintain pool temperature below 38°C (100°F).

2103 Power Reactors, Nonbreeding, Graphite Moderated

Refer also to citation(s) 7653, 7719, 7722, 7727, 8508

7667 (PSI–94-17) **Evaluation of the SMOLENSK-3 NPP shutdown system. Phase I: code implementation and testing. First progress report.** Saphier, D. (Paul Scherrer Inst. (PSI), Villigen (Switzerland)); Hennig, D.; Knoglinger, E. Paul Scherrer Inst. (PSI), Villigen (Switzerland). Oct 1994. 124p. Order Number DE95615943. Source: OSTI; NTIS; INIS.

The purpose of the present program is to investigate the adequacy of the existing RBMK shutdown system, with particular attention to the Smolensk-3 reactor. The program will also establish the "tools" necessary for a thorough investigation of the RBMK reactors. The elements included under the heading of "tools" include the necessary programs for steady state and transient investigations of neutronic and thermal hydraulic phenomena, methods to calculate RBMK cross-sections, a data base comprising the sufficient and necessary information on the relevant reactors and operational practices, and a detailed description of some critical experiments in order to verify the "tools" to be used in the present investigation. This report describes the first part of the study, which is outlined in detail in the Executive Summary. This includes in particular the installation of the various operational tools, verification of these tools with the Chernobyl-3 critical experiment at cold zero power, collection of the data, and preliminary analyses of the Smolensk-3 void effect in the fuel- and control rod channel at hot zero power and cold zero power conditions. The RBMK reactors are very heterogeneous and therefore a good model for this core requires a full core 3-D representation. A 3-D neutronic calculation of this large reactor is quite time consuming and consequently a 12x12 assemblies subsection (one 1/12 of the core) was also used for fast scoping studies. This 12x12 model does not provide correct absolute values but will indicate the trend of various phenomena. From the calculations performed in the present phase of the project it is obvious that the reactivity increase due to voiding the core in the improved versions of RBMK (e.g. that of Smolensk-3) is much smaller than for the older designs. (author) figs., tabs., 10 refs.

2104 Power Reactors, Nonbreeding, Otherwise Moderated Or Unmoderated

Refer also to citation(s) 7683, 7715, 7763

7668 (KAERI/RR–1311/93) **A study on manufacturing and quality control technology of DUPIC fuel -A study on the direct use of spent PWR fuel in CANDU reactors-.** Yang, Myeong Seung (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Park, Hyeon Soo; Lee, Yeong Uh; Na, Sang Ho; Lee, Jeong Won; Song, Keun Uh; Bae, Ki Kwang; Kim, Han Soo; Kim, Bong Goo; Kim, Shi Hyeong. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jul 1994. 240p. (In Korean). Order Number DE95612923. Source: OSTI; NTIS; INIS.

As the first year of the experimental research for the manufacturing and irradiation of prototypic DUPIC nuclear fuel, UO_2 pellets made from the natural uranium dioxide were used for the study of OREOX (oxidation/reduction of oxide fuel) process. The reference oxidation and reduction processes were established from the evaluation of the characteristics of produced powders and pellets. The manufacturing process and the layout of the manufacturing equipment were established in consideration of the high radioactivity of DUPIC process and the function of hot cells. The properties of materials to be used for DUPIC manufacturing were evaluated, and the punching machine for decladding was also developed. (Author).

7669 (KAERI/RR–1317/93) **Design and analysis of CANDU advanced fuel -Development of the advanced CANDU technology-.** Seok, Ho Cheon (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Shim, Ki Seop; Byeon, Taek Sang; Park, Kwang Seok; Kim, Bong Ki; Lee, Yeong Uk; Jeong, Chang Joon; Oh, Deok Joo; Lee, Ui Joo; Park, Joo Hwan; Lee, Sang Yong; Jeong, Beop Dong; ChKorea Cancer Center Hospital, Seoul (Korea, Republic of). Jul 1994. 347p. (In Korean). Order Number DE95612924. Source: OSTI; NTIS; INIS.

It has been projected that a total of 5 pressurized heavy water reactors (PHWR) including Wolsong 1 under operation and Wolsong 2, 3 and 4 under construction will be operated by 2006, and so about 500 ton of natural uranium will be consumed every year and a lot of spent fuels will be generated. Therefore, the ultimate goal of this R and D project is to develop the CANDU advanced fuel having the following capabilities compared with existing standard fuel: (1) To reduce linear heat generation rating by more than 15% (i.e., less than 50 kW/m), (2) To extend fuel burnup by more than 3 times (i.e., higher than 21,000 MWD/MTU), and (3) To increase critical channel power by more than 5%. In accordance, the followings are performed in this fiscal year: (1) Undertake CANFLEX-NU design and thermalmechanical performance analysis, and prepare design documents, (2) Establish reactor physics analysis code system, and investigate the compativility of the CANFLEX-NU fuel with the standard 37-element fuel in the CANDU-6 reactor. (3) Establish safety analysis methodology with the assumption of the CANFLEX-NU loaded CANDU-6 reactor, and perform the preliminary thermalhydraulic and fuel behavior for the selected DBA accidents, (4) Investigate reactor physics analysis code system as pre-study for CANFLEX-SEU loaded reactors.

7670 (KAERI/RR–1326/93) **Verification tests for CANDU advanced fuel -Development of the advanced CANDU technology-.** Chung, Jang Hwan (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Suk, Ho Cheon; Jeong, Moon Ki; Park, Joo Hwan; Jeong, Heung Joon; Jeon, Ji Soo; Kim, Bok Deuk. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jul 1994. 171p. (In Korean). Order Number DE95612925. Source: OSTI; NTIS; INIS.

This project is underway in cooperation with AECL to develop the CANDU advanced fuel bundle (so-called, CANFLEX) which can enhance reactor safety and fuel economy in comparison with the current CANDU fuel and which can be used with natural uranium, slightly enriched uranium and other advanced fuel cycle. As the final schedule, the advanced fuel will be verified by carrying out a large scale demonstration of the bundle irradiation in a commercial CANDU reactor, and consequently will be used in the existing and future CANDU reactors in Korea. The research activities during this year Out-of-pile hydraulic tests for the prototype of CANFLEX bundle was conducted in the CANDU-hot test loop at KAERI. Thermalhydraulic analysis with the assumption of CANFLEX-NU fuel loaded in Wolsong-1 was performed by using thermalhydraulic code, and the thermal margin and T/H compatibility of CANFLEX bundle with existing fuel for CANDU-6 reactor have been evaluated. (Author).

7671 (KAERI/RR–1332/93) **Development of fabrication technology for CANDU advanced fuel -Development of the advanced CANDU technology-.** Choi, Chang Beom; Kim, Hyeong Soo; Kim, Sang Won; Seok, Ho Cheon; Shim, Ki Seop; Byeon, Taek Sang; Jang, Ho Il; Kim, Sang Sik; Choi, Il Kwon; Cho, Dae Sik; Sheo, Seung Won; Lee, Soo Cheol; Kim, Yoon Hoi; Park, Choon Ho; Jeong, Seong Hoon; Kang, Myeong Soo;Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jul 1994. 318p. (In Korean). Order Number DE95612926. Source: OSTI; NTIS; INIS.

The present study is to develop the advanced CANDU fuel fabrication technologies by means of applying the R and D results and experiences gained from localization of mass production technologies of CANDU fuels. The annual portion of this year study includes following: 1. manufacturing of demo-fuel bundles for out-of-pile testing 2. development of technologies for the fabrication and inspection of advanced fuels 3. design and munufacturing of fuel fabrication facilities 4. performance of fundamental studies related to the development of advanced fuel fabrication technology.

7672 (KAERI/RR–1344/93) **DUPIC facility engineering -A study on the direct use of spent PWR fuel in CANDU reactors-.** Park, Hyun Soo (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Lee, Jae Seol; Kim, Ho Dong; Song, Ki Chan; Choi, Jong Won; Yoon, Ji Seop; Jeon, Yong Beom; Seo, Ki Seok; Lee, Han Myeong; Moon, Ki Hwan; Lim, Chang Saeng. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Aug 1993. 276p. (In Korean). Order Number DE95612927. Source: OSTI; NTIS; INIS.

The applicability of KAERI facilities (PIEF for disassembly)cutting of spent PWR fuel and post irradiation examination of DUPIC fuel, IMEF for DUPIC fuel fabrication, KMRR for irradiation of DUPIC fuel and RWTF for radwaste treatment and storage, which would be usable for performing the Phase II of DUPIC 'Experimental Verification' was reviewed from the standpoint of system engineering. The engineering parameters for refurbishments of IMEF M6 cell to be applied for DUPIC fuel fabrication are also reviewed and some transportation casks to move samples and specimens between the facilities were reviewed. The reference fuel was established from the characteristics of spent PWR fuel out of nuclear power plant. Based on the balance of fuel, the balance of fuel material was evaluated qualitatively between DUPIC and once-through cycle, and the preliminary economic analysis between two cycles was performed. The spent fuel arising and the environmental safety were also evaluated. Cooperative actions for the Phase II of DUPIC being implemented on a tripartite frame between Korea-Canada-U.S.A and a brief survey on the prospectives of applying the DUPIC fuel cycle concept on global level were touched upon. (Author).

7673 (KAERI/RR–1377/93) **Development of advanced CANDU PHWR -Development of the advanced CANDU technology-.** Seok, Ho Cheon; Na, Yeong Hwan; Seok, Soo Dong; Lee, Bo Uk; Kwak, Ho Sang; Kim, Bong Ki; Kim, Seok Nam; Min, Byeong Joo; Park, Jong Ryunl; Shin, Jeong Cheol; Lee, Kyeong Ho; Lee, Dae Hee; Lee, Deuk Soo; Lee, Yeong Uk; Lee, Jeong Yang; Jwon, Jong Seon; JwonKorea Cancer Center Hospital, Seoul (Korea, Republic of). Jul 1994. 541p. (In Korean). Order Number DE95612929. Source: OSTI; NTIS; INIS.

The target of this project is to assess the feasibility of improving PHWR and to establish the parameter of the improved concept and requirements for developing it. To set up the requirements for the Improved Pressurized Heavy Water Reactor: (1) Design requirements of PHWR main systems and Safety Design Regulatory Requirements for Safety Related System i.e. Reactor Shutdown System, Emergency Core Cooling System and Containment System were prepared. (2) Licensing Basis Documents were summarized and Safety Analysis Regulatory. Requirements were reviewed and analyzed. To estimate the feasibility of improving PHWR and to establish the main parameters of the concept of new PHWR in future: (1) technical level/developing trend of PHWR in

Korea through Wolsong 2, 3 and 4 design experience and Technical Transfer Program was investigated to analyze the state of basic technology and PHWR improvement potential. (2) CANDU 6 design improvement tendency, CANDU 3 design concept and CANDU 9 development state in other country was analyzed. (3) design improvement items to apply to the reactors after Wolsong 2, 3 and 4 were selected and Plant Design Requirements and Conceptual Design Description were prepared and the viability of improved HWR was estimated by analyzing economics, performance and safety. (4) PHWR technology improving research and development plan was established and international joint study initiated for main design improvement items.

2105 Power Reactors, Breeding

Refer also to citation(s) 7278, 7321, 7788, 7790, 7791, 7792

7674 (ANL/ET/CP–84795) **Status of the solid breeder materials database.** Billone, M.C. (Argonne National Lab., IL (United States)); Dienst, W.; Lorenzetto, P.; Noda, K.; Roux, N. Argonne National Lab., IL (United States). [1995]. 20p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9406171–4: 3. international workshop on ceramic breeder blanket interactions, Los Angeles, CA (United States), 22-24 Jun 1994). Order Number DE95004628. Source: OSTI; NTIS; INIS; GPO Dep.

The databases for solid breeder ceramics (Li_2O, Li_4SiO_4, Li_2ZrO_3, and $LiAlO_2$) and beryllium multiplier material were critically reviewed and evaluated as part of the ITER/CDA design effort (1988-1990). The results have been documented in a detailed technical report. Emphasis was placed on the physical, thermal, mechanical, chemical stability/compatibility, tritium retention/release, and radiation stability properties which are needed to assess the performance of these materials in a fusion reactor environment. Materials properties correlations were selected for use in design analysis, and ranges for input parameters (e.g., temperature, porosity, etc.) were established. Also, areas for future research and development in blanket materials technology were highlighted and prioritized. For Li_2O, the most significant increase in the database has come in the area of tritium retention as a function of operating temperature and purge flow composition. The database for postirradiation inventory from purged in-reactor samples has increased from four points to 20 points. These new data have allowed an improvement in understanding and modeling, as well as better interpretation of the results of laboratory annealing studies on unirradiated and irradiated material. In the case of Li_2ZrO_3, relatively little data were available on the sensitivity of the mechanical properties of this ternary ceramic to microstructure and moisture content. The increase in the database for this material has allowed not only better characterization of its properties, but also optimization of fabrication parameters to improve its performance. Some additional data are also available for the other two ternary ceramics to aid in the characterization of their performance. In particular, the thermal performance of these materials, as well as beryllium, in packed-bed form has been measured and characterized.

7675 (ANL/ET/CP–84844) **Progress in tritium retention and release modeling for ceramic breeders.** Raffray, A.R. (ITER Joint Work Site, Garching (Germany)); Federici, G.; Billone, M.C.; Tanaka, S. Argonne National Lab., IL (United States). 11 Jul 1994. 30p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-940664–35: ISFNT-3: 3rd international symposium on fusion nuclear technology, Los Angeles, CA (United States), 27 Jun - 1 jul 1994). Order Number DE95004627. Source: OSTI; NTIS; INIS; GPO Dep.

Tritium behavior in ceramic breeder blankets is a key design issue for this class of blanket because of its impact on safety and fuel self-sufficiency. Over the past 10-15 years, substantial theoretical and experimental efforts have been dedicated world-wide to develop a better understanding of tritium transport in ceramic breeders. Models that are available today seem to cover reasonably well all the key physical transport and trapping mechanisms. They have allowed for reasonable interpretation and reproduction of experimental data and have helped in pointing out deficiencies in material property data base, in providing guidance for future experiments, and in analyzing blanket tritium behavior. This paper highlights the progress in tritium modeling over the last decade. Key tritium transport mechanisms are briefly described along with the more recent and sophisticated models developed to help understand them. Recent experimental data are highlighted and model calibration and validation discussed. Finally, example applications to blanket cases are shown as illustration of progress in the prediction of ceramic breeder blanket tritium inventory.

7676 (IAEA-TECDOC–766, pp. 77-85) **Civil plutonium handling experience in the production of fuel, fuel elements and assemblies for fast reactors.** Skiba, O.V. (Research Inst. of Atomic Reactors, Dimitrovgrad (Russian Federation)); Mayorshin, A.A.; Porodnov, P.T.; Kisly, V.A.; Kirillovich, A.P.; Ovsyannikov, Y.F.; Keruchenko, S.S. International Atomic Energy Agency, Vienna (Austria). Oct 1994. (CONF-9310405–: Technical committee meeting on safe handling, transport and storage of plutonium, Vienna (Austria), 18-21 Oct 1993). In *Safe handling, transport and storage of plutonium. Proceedings of a technical committee meeting held in Vienna, 18-21 October 1993.* 120p. Order Number DE95614900. Source: OSTI; NTIS (US Sales Only); INIS.

Work on integrating plutonium into the nuclear fuel cycle has been underway since the mid-1970s. This work is the first stage of implementing the closed fuel cycle. Unlike the traditional technologies of fuel cycle, based on aqueous fuel reprocessing and fuel element manufacture with a compact pellet column, the fuel cycle at RIAR is based on "dry" methods of fuel reprocessing and on the fuel element manufacture by means of vibropacking. In the last 15 years there was a wide scope of investigations of fast reactor fuel cycles. In the process of these investigations, experience was gained in both the problem of providing safe initiation of civil plutonium into the fast reactor's fuel cycle and in operation of pilot facilities for remote manufacture of granulated fuel, fuel elements and assemblies. The automated, remotely controlled, pilot facilities complex at RIAR was located in shielded chambers and was capable of producing 40-50 fuel assemblies of the BOR-60 reactor per year. In the course of experimental operation from 1977 to 1986, there were produced about 2 tonnes of granulated fuel containing 1 tonne of Pu of different isotopic compositions and origins. More than 11 thousand fuel elements (300 fuel assemblies) were manufactured for BOR-60. The experience and knowledge gained in this operation was the basis for redesign of the pilot facilities complex, using the existing shielded chambers and remote servicing means to produce U-Pu oxide fuel, fuel elements and fuel assemblies for the BN 600 fast power reactors. Pilot research complex operation was started in 1989 and 26 fuel assemblies for BN-type reactors have been produced so far. The available capacity of fuel reprocessing, fuel elements and assemblies manufacture allow about 40 fuel assemblies to be produced per year for fast power reactors. (author). 10 refs, 5 figs.

7677 (KAERI/RR–1228/92) **Liquid metal reactor development.** Cho, Man; Kim, Yeong Cheol; Kim, Shi Hwan; Choi, Yeong Myeong; Sho, Dong Seop; Kim, Yeong In; Park, Joo Hwan; Kim, Yeong Kyoon; Song, Hoon; Kim, Yeong In; Cho, Chang Yeon; Cho, Seok Hong; Lee, Dong Jin; Kim, Jong Sook; Jeon, Hyeong Ryeon; Kim, Jeong Do; KiKorea Cancer Center Hospital, Seoul (Korea, Republic of). May 1993. 102p. (In Korean). Order Number DE95612931. Source: OSTI; NTIS; INIS.

On this year the study was performed in two parts : The establishment of LMR development plan, and the development of LMR coolant technology 1. The establishment of LMR technologies, the domestic political and technical environment, economics and technical maturity were duly considered for comparative analysis. In this year technologies specific to LMRs and technologies common to both PWRs and LMRs were identified to understand the inter-relationships between those two categorized technologies. Including those two categories, an overall LMR technology tree was drawn up taking into consideration technologies and tasks necessary to the pool type design of the primary and secondary cooling systems. And technology options that should be thoroughly evaluated their comparative feasibilities and applicabilities in trade-off study were derived as a preliminary procedure for the selection of the reactor type. 2. The development of LMR coolant technology.

Many relevant basic technologies should be developed for LMR to have the inherent safety characteristics and to be economical. Since the sodium(Na) being used as the coolant in LMR has several thermo-hydraulic characteristics differing from water, the sodium handling technique which provides the maximum utilization of the thermo-hydraulic merits of the sodium and the protection measures against its defects is one of the most important technologies for the development of LMR. In the present study many problems associated with the establishment of the technology for measuring and controlling the impurity in the Na-facility have been investigated. The conceptual design of the purity control system in the Na-facility and related purity control system have been also made. The test-run of the Na-loop facility constructed last year has been performed, which provided the technology necessary for operation and repair of the Na-facility.

7678 (KAERI/RR–1378/93) **A study on the safety measures of LMR coolant -Liquid metal reactor development-.** Hwang, Sung Tai (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Choi, Yun Dong; Kwon, Seon Kil; Cho, Byeong Ryeol; Kim, Kwang Rak; Kwon, Sang Un; Kim, Byeong Ho; Jeong, Ji Yeong; An, Seon Soo; Park, Jin Ho; Choi, Jong Hyeon; Kim, Tae Joon; JKorea Cancer Center Hospital, Seoul (Korea, Republic of). Aug 1994. 497p. (In Korean). Order Number DE95612932. Source: OSTI; NTIS; INIS.

A study on safety measures of LMR coolant showed the results as follows ; 1. LMR coolant safety measure: (1) Peak gas pressure decreases significantly when the droplet diameter is increased, but peak gas pressure increases with initial oxygen concentration, sodium quantity and sodium temperature. (2) The surface combustion model was used for the analysis of sodium pool fire in a test vessel. It was turned out that this model showed the over estimation results about the combustion rate and sodium temperature in comparison with experimental results. 2. Sodium fire aerosol characteristics: (1) Aerodynamic mean diameter decrease according to increase of measuring times, injection temperature and injection pressures. (2) Combined sodium fire aerosols and spray fire aerosols are classified the same from the point view of aerosol characteristics. 3. Sodium purification technology: (1) The major design parameters of the cold trap are cooling method, trapping temperature, residence time and flow rate. A residence time of 3-5 min and a flow rate of 1-20 g/min are desirably accepted by cold trap designers. (2) The important factors for design and performance of plugging meter are size and type of flow restrictor, sodium flow rate, cooling rate. 4. The characteristics of sodium-water reaction: (1) The investigations for characteristics of sodium-water reaction and leak detection, and the construction of hydrogen detector.

2106 Power Reactors, Mobile, Propulsion, Package, and Transportable

Refer also to citation(s) 7784

7679 (FEI–2271) **Thermodynamical optimization of the space power plants on the base of criterion of specific mass in generalized design variables.** Linnik, V.A.; Yuferov, A.G. Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk (Russian Federation). Fiziko-Ehnergeticheskij Inst. 1992. 16p. (In Russian). Order Number DE95612955. Source: OSTI; NTIS (US Sales Only); INIS.

The conditions of minimum of specific mass of the space power plant are established with account of heat loss and mass-coefficients of subsystems. 3 refs.; 3 figs.

7680 Electrical insulator assembly with oxygen permeation barrier. Van Der Beck, R.R.; Bond, J.A. To Dept. of Energy. 1992. Filed date 12 Nov 1992. U.S. Patent Application 7-989,609. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-86SF16006. Order Number DE95006116. Source: OSTI; NTIS (US Sales Only); GPO Dep.

Disclosed is a high-voltage electrical insulator for electrically insulating a thermoelectric module in a spacecraft from a niobium-l% zirconium alloy wall of a heat exchanger filled with liquid lithium while providing good thermal conductivity between the heat exchanger and the thermoelectric module. The insulator has a single crystal alumina layer (S x Al_2O_3, sapphire) with a niobium foil layer bonded thereto on the surface of the alumina crystal facing the heat exchanger wall, and a molybdenum layer bonded to the niobium layer to act as an oxygen permeation barrier to preclude the oxygen depleting effects of the lithium from causing undesirable niobium-aluminum intermetallic layers near the alumina-niobium interface.

2107 Regulation and Licensing

Refer also to citation(s) 7647

7681 (NUREG–0304-Vol.19-No.3) **Regulatory and technical reports (abstract index journal): Compilation for third quarter 1994, July–September. Volume 19, Number 3.** Nuclear Regulatory Commission, Washington, DC (United States). Div. of Freedom of Information and Publications Services. Dec 1994. 54p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). Source: OSTI; NTIS; GPO; INIS.

This compilation consists of bibliographic data and abstracts for the formal regulatory and technical reports issues by the U.S. Nuclear Regulatory Commission (NRC) Staff and its contractors. It is NRC's intention to publish this compilation quarterly and to cumulate it annually. The main citations and abstracts in this compilation are listed in NUREG number order: NUREG-XXXX, NUREG/CP-XXXX, NUREG/CR-XXXX, and NUREG/IA-XXXX. These precede the following indexes: Secondary Report Number Index, Personal Author Index, Subject Index, NRC Originating Organization Index (Staff Reports), NRC Originating Organization Index (International Agreements), NRC Contract Sponsor Index (Contractor Reports) Contractor Index, International Organization Index, Licensed Facility Index. A detailed explanation of the entries precedes each index.

7682 (NUREG–1100-Vol.11) **Budget estimates - fiscal years 1996-1997.** Nuclear Regulatory Commission, Washington, DC (United States). Feb 1995. 197p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). Source: OSTI; NTIS; GPO; INIS.

The U.S. Congress has determined that the safe use of nuclear materials for peaceful purposes is a legitimate and important national goal. It has entrusted the NRC with the primary Federal responsibility for achieving that goal. The NRC's mission, therefore, is to ensure adequate protection for the public health and safety, the common defense and security, and the environment in the use of nuclear materials in the United States. The NRC's scope of responsibility includes regulation of commercial nuclear power plants; research, test, and training reactors; fuel cycle facilities; medical, academic, and industrial uses of nuclear materials; and the transport, storage, and disposal of nuclear materials and wastes. The NRC carries out its mission by setting standards and requirements that licensees must meet to design, construct, and operate safe facilities, in the form of rules, license conditions, and regulatory guidance; inspecting facilities and taking enforcement action, as necessary, to ensure that such standards are followed; and conducting research to support, confirm, or refine judgments used in regulatory decisions. The technologies involved in the use of nuclear energy are relatively new and complex. Regulatory decisions often require conservatism to account for technical uncertainty. Conservatisms should be modified appropriately as increased understanding of physical phenomena and interactions is achieved. Further, essential functions must be maintained through appropriate combinations of high component and system reliability, redundancy, and diversity to provide multiple barriers to the release of radiation (defense-in-depth).

2108 Economics

Refer also to citation(s) 7766

7683 (KAERI/RR–1345/93) **Fuel management and safety analysis -A study on the direct use of spent PWR fuel in CANDU reactors-.** Rhee, Bo Wook (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Choi, Hang Bok; Kim, Bong Gi;

Lee, Young Ook; Chung, Chang Joon; Hwang, Wan; Kim, Il Kon; Cho, Jae Seon; Park, Chang Jae; Huh, Chang Uk. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jul 1994. 144p. (In Korean). Order Number DE95612928. Source: OSTI; NTIS; INIS.

From the previous year research, it was expected that power pulse during LOCA for CANDU loaded with DUPIC fuel be steeper and higher than that for the CANDU loaded with natural uranium fuel. As a potential resolution to this concern, a fuel bundle concept was proposed composed of fuel pins of 35,000 MWD/TU DUPIC fuel composition, except the center pin mixed with burnable poison called DY-164. In addition to this center pin poisoning, lowering the total fissile isotopes in inner ring pins than that of the DUPIC fuel composition of 35,000 MWD/TU PWR burnup should enhance the reduction of positive reactivity insertion under half core voiding and raising the total amount of fissile isotopes in outer ring pins to minimize the burnup penalty due to burnable poison. Major outcome of this year research was (1) identification of the amount of DY-164 needed to keep the peak reactor power during LOCA at the same level as a natural uranium fuelled core. (2) the calculation of the power distribution in the bundle and the core and the comparison of the maximum channel and bundle powers for individual fuel options with those of the natural uranium CANDU-6 core. It is found that the maximum powers of DUPIC fuel options are several % lower than those and operation limits of Wolsung-2. However, it did not account for the uncertainty in nuclear design calculation caused by applying the analysis tools and cross section library not yet validated for DUPIC application and the inhomogeneity and measurement uncertainty in the fissile isotopes and fission products in the DUPIC pellet. For the start of basic design of the DUPIC fuel fabrication facilities, off-gas trapping and treatment system, the safeguards systems, basic composition of DUPIC test fuel bundle is necessary. Thus a best choice was made among the 3 fuel composition options investigated based on assessing various aspects such as core power distribution, etc.

7684 (NEI-SE–172) **A review of the scope and the cost of the Swedish nuclear waste management system.** Nuclear Assurance Corp., Norcross, GA (United States). Mar 1994. 72p. Order Number DE95613273. Source: OSTI; NTIS; INIS.

A Swedish translation of this report appears as an appendix in SOU 1004:108 (ISBN 91-38-13755-0). The report is prepared for the Nuclear Fond Commission and Ministry of Environment and Natural Resources.

22 NUCLEAR REACTOR TECHNOLOGY

7685 (JINR–5-62-93) **JINR rapid communications. Collection 5.** Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1993. 73p. (In English, Russian). Order Number DE95615834. Source: OSTI; NTIS (US Sales Only); INIS.

Recent results of research and development at JINR are presented in six contributions covering feasibility studies of electro nuclides energy generation; multichannel time-of-flight and silicon tracking detector systems; dibaryon structure studies and the application of reactor-parallel computers for solving the eigenvalue problem for integral equations.

7686 (KAERI/RR–1323/93) **Thermal hydraulic tests for reactor safety system -Research on the improvement of nuclear safety-.** Chung, Moon Ki (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Park, Chun Kyeong; Yang, Seon Kyu; Chung, Chang Hwan; Chun, Shee Yeong; Song, Cheol Hwa; Chun, Hyeong Gil; Chang, Seok Kyu; Chung, Heung Joon; Won, Soon Yeon; Cho, Yeong Ro; Kim,Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jul 1994. 298p. (In Korean). Order Number DE95612787. Source: OSTI; NTIS; INIS.

The present research aims at the development of the thermal hydraulic verification test technology for the reactor safety system of the conventional and advanced nuclear power plant and the development of the advanced thermal hydraulic measuring techniques. (Author).

2201 Theory and Calculation

Refer also to citation(s) 7667, 7765, 9135, 9136

7687 (DTU-AEF-NT–12) **Improvements in a four factor formula recipe for lattice calculations.** Oelgaard, P.L. Danmarks Tekniske Univ., Lyngby (Denmark). Afd. for Elektrofysik. Dec 1994. 34p. Order Number DE95615835. Source: OSTI; NTIS; INIS.

In reactor physics courses and standard text books the four factor formula and two group theory is often used to demonstrate to the students the physical processes in the chain reaction of nuclear reactors. When compared with measurements, in particular of light water reactors, the agreement between these simple recipes and measurements is not very good. In this report it has been investigated whether it is possible to introduce some relative simple modifications to such a recipe in order to obtain better agreement between theory and measurements. The modifications considered were: (1) The introduction of the Westcott rs-term. (2) An improved model for the fast fission factor ϵ. (3) An improved model for the slowing-down length L_s. (4) The introduction of a Dancoff correction in the calculation of the resonance escape probability p. (5) An improved model for the neutron temperature of the fuel. With these modifications the agreement between measurements and calculations of light water, slightly enriched uranium metal rod lattices was greatly improved. However, it is necessary to consider more, different lattices in order to evaluate the general validity of these apparent recipe improvements. (au).

7688 (FEI–2298) **Combined calculation of in-pile experimental devices by the Monte Carlo method.** Leont'ev, V.V.; Polevoj, V.B. Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk (Russian Federation). Fiziko-Ehnergeticheskij Inst. 1992. 12p. (In Russian). Order Number DE95612790. Source: OSTI; NTIS (US Sales Only); INIS.

Monte Carlo coupled calculations are used for modelling functionals of neutron flux in the research reactor experimental devices. On the first step, the device is replaced by black body (BB) and the surface source is obtained by interrupting each neutron path having crossed BB. On the second step, BB is replaced by the device and the coupled transport problem is then solved with stored neutrons as a source. The method is realized on the basis of the MMKFK code system. 16 refs.; 2 figs.

7689 (INIS-mf–14437-Vol.1) **Vol. 1: Selected chapters in reactor theory.** Bezpecnost Jadernych Zarizeni, no.4. Matejka, K. (ed.) (Ceske Vysoke Uceni Technicke, Prague (Czech Republic). Fakulta Jaderna a Fysikalne Inzenyrska); Fleischhans, J.; Hejzlar, R. No corporate text available. Jun 1994. 449p. (In Czech). Order Number DE95615836. Source: OSTI; NTIS (US Sales Only); INIS.

Basic principles of nuclear reactors are explained. Nuclear and neutron physics fundamentals are outlined, including the atomic structure theory, radioactivity, and nuclear reactions. The reactor physics text concentrates on the neutron balance of the fission chain reaction, neutron diffusion, neutron moderation, nuclear reactor theory, the reactor in the steady state and in operating conditions, and nuclear reactor shielding. Nuclear reactor dynamics is described. The treatment of the research reactor thermohydraulics is focused on the generation of heat in the reactor, heat convection in the fuel elements, heat transfer, temperature distribution in the fuel channel, and reactor core hydrodynamics. Emergency reactor analyses are also dealt with. The text is adapted to the study of research and experimental reactors. (J.B.). 3 tabs., 36 figs., 10 refs.

7690 (KAERI/RR–1265/93) **Thermal-hydraulic characteristics of safety systems in advanced reactors Part 1. Heat transfer in passive containment cooling system. Part 2. Fluid mixing with safety injection.** Cha, Jong Hee (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Chung, Moon Ki; Won, Soon Yeun; Jun, Hyung Gil. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Dec 1993. 138p. (In Korean). Order Number DE95612791. Source: OSTI; NTIS; INIS.

The heat transfer rates that occur inside and outside surfaces of the passive containment cooling system with both dry and wet outer containment surface following a postulated accident were investigated. The test model represented a 60 section of a containment vessel based on the AP600 geometry. In part 2, the

comparitive study between AP600 DVI and ABB-CE System 80+ was carried out with experimental methods. And the effects of deflector were investigated. (Author).

2202 Components and Accessories

Refer also to citation(s) 7627, 7823

7691 (FEI–2231) **Program for calculation of two-dimensional nonstationary temperature fields in NPP arbitrary geometrical element.** Shimanskaya, T.M.; Shimanskij, A.A.; Chernikova, T.V. Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk (Russian Federation). Fiziko-Ehnergeticheskij Inst. 1992. 28p. (In Russian). Order Number DE95612796. Source: OSTI; NTIS (US Sales Only); INIS.

The MRIYA program developed for calculation of transient one-ore two-dimensional temperature fields in any part of a nuclear power plant is described. The program efficiency is achieved by including the universal geometrical block and using the implicit Euler method in the thermal dynamics mathematical model differential equations system integration. The system integration is based on fast LU-decomposition algorithm for sparse system of equations solution. 9 refs.; 8 figs.; 4 tabs.

7692 (KAERI/RR–1267/93) **A study on the change in dynamic characteristics of reactor internals.** Kim, Tae Ryong (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Jung, Seung Ho; Park, Jin Ho; Park, Jin Suk; Jeong, Keong Hoon. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Dec 1993. 142p. (In Korean). Order Number DE95612797. Source: OSTI; NTIS; INIS.

An experimental and analytical studies were performed to establish the relationship between in-air dynamic characteristics of reactor internals and in-water ones by using a scaled-down model which consists of CSB (flexible) and RPV (rigid) models. The experimental results show that the natural frequencies of the CSB model in water are remarkably lowered than those in air, and the normalized natural frequency (in-water frequency/in-air frequency) of the CSB model exists between in-phase mode and out-of-phase mode values of the flexible-to-flexible co-axial cylindrical structure which has the same dimensions as the scaled-down model. The normalized frequency increases to asymptotically reach the in-phase mode frequency of the flexible co-axial cylindrical structure as circumferential mode number (n) increases, while decreases to come near of the out-of-phase mode value as the circumferential mode number decreases. The support condition change for the CSB model in waster made the frequency of 1st axial mode (pure beam mode) shifted into lower value without any effect on the other modes. The changing trend of the natural frequencies and the mode shapes resulted from the finite element analysis by using the ANSYS code shows good agreement with the experimental results both in air and in water cases. In addition, a theoretical study was also performed by simplifying the scaled-down model as flexible-to-rigid co-axial cylindrical structure. It is found that the in-air natural frequencies shows good agreement with both the experimental and finite element analysis results, while the in-water frequencies reveals rather discrepancies. (Author).

7693 (KAERI/RR–1283/93) **A study on the thermal and mechanical properties of inconel for steam generator U-tube.** Ryu, Woo Seong (Korea Atomic Energy Res. inst., Taejon (Korea, Republic of)); Kang, Young Hwan; Park, Jong Man; Choo, Kee Nam; Kim, Sung Soo; Maeng, Wan Young; Park, Se Jin. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Dec 1993. 136p. (In Korean). Order Number DE95612798. Source: OSTI; NTIS; INIS.

A series of laboratory tests was conducted to obtain the thermal and mechanical properties of Inconel 600 and 690 for the design document of steam generator U-tube. The following properties were measured as a function of temperature, and treated statistically to establish a database: (1) heat capacity, RT $\approx$ 500 deg C, (2) thermal expansion, RT $\approx$ 500 deg C, (3) thermal diffusivity, RT $\approx$ 500 deg C, (4) thermal conductivity, RT $\approx$ 500 deg C, (5) tensile property, RT $\approx$ 700 deg C (6) ductility, RT $\approx$ 700 deg C, (7) Elastic modulii and Poission's ratio, RT, (8) Microhardness, (9) Oxidation rate. (Author).

7694 (KAERI/RR–1293/93) **A preliminary study for the life extension of nuclear power plants.** Kim, Uh Chul (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Chung, Han Sub; Kim, Hong Pyo; Lee, Eun Hee; Hwang, Seong Sik; Hur, Do Haeng. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Dec 1993. 110p. (In Korean). Order Number DE95612799. Source: OSTI; NTIS; INIS.

Steam generator tubings of a nuclear power plant are very thin to have efficient heat exchange. Steam generator tubings have experienced various types of corrosion damages under the sludge pile and in the tube-tube sheet crevice during operation at high temperature and high pressure. Types of degradation of steam generator tubings found in domestic nuclear power plants are pitting, secondary side stress corrosion cracking caused by Pb, primary water SCC, and fretting in the area in contact with antivibration bar. The ACPD (Alternate Current Potential Drop), which can detect the initiation and propagation of the microcracks, was assembled. The C-ring specimens were machined in order to test a stress corrosion cracking in Pb containing aqueous solution. The denting (stress increasing factor) test on the carbon steel was conducted, and pitting resistance of the different alloy was evaluated. As a result of the chemical cleaning process, it is concluded that the high temperature (125 deg C) chemical cleaning process could be applicable. And it was investigated that there were many cases of cracking of high strength materials used in the reactor internals throughout world. There was a failure in Korea also. (Author).

7695 (KAERI/RR–1299/93) **Intelligent control and automation technology for nuclear applications.** Kim, Jae Hee (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Kim, Ko Ryeo; Lee, Jae Cheol; Eom, Heung Seop; Lee, Jang Soo. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jan 1994. 112p. (In Korean). Order Number DE95612684. Source: OSTI; NTIS; INIS.

Using recently established intelligent mobile robot theory and high technologies in computer science, we have designed an inspection automation system for welded parts of the reactor vessel, and we intend to establish basic technologies. The recent status of those technologies is surveyed for various application areas, and the characteristics and availability of those techniques such as intelligent mobile robot, digital computer control, intelligent user interface, realtime data processing, ultrasonic signal processing, intelligent user interface, intelligent defect recognition, are studied and examined at first. The high performance and compact size inspection system is designed, and if implemented, it is expected to be very efficient in economic point of view. In addition, the use of integrated SW system leads to the reduction of human errors. Through the analysis results and experiences, we investigated the further feasibility of basic technology applications to the various similar operation systems in NPP. (Author).

7696 (KAERI/RR–1307/93) **Development of fatigue monitoring system in nuclear power plants.** Yoo, Bong (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Kim, Jong In; Lee, Jae Han; Lee, Hyeong Yeon; Kim, Jong Bum; Kim, Yong Wan; Koo, Kyong Hoe. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Mar 1994. 179p. (In Korean). Order Number DE95612800. Source: OSTI; NTIS; INIS.

The direct stress analysis method used for the fatigue analysis was proven to be effective and straight forward in application to fatigue monitoring system in nuclear power plants. The stress intensity factor obtained from the method using Green's function and Duhamel's integration have shown good agreement with those evaluated by the standard finite element analysis and will be used for the crack monitoring system. The fatigue monitoring program of K-FAMS was applied to YGN unit 1 surge line in heat up field operation and verified the application to a nuclear power plant. The real time fatigue monitoring system can give an important information on the life extension of the existing plants as well as the design improvement of the next power plants. (Author).

7697 (WSRC-MS–94-0632) **Residual Stress Measurements with Laser Speckle Correlation Interferometry and Local Heat Treating.** Pechersky, M.J. (Westinghouse Savannah River Company, SC (United States)); Miller, R.F.; Vikram, C.S. Westinghouse Savannah River Co., Aiken, SC (United States). 6 Jan 1994. 26p.

Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. (CONF-950226–3: SPIE '95: SPIE conference on optics, electro-optics, and laser application in science, engineering and medicine, San Jose, CA (United States), 5-10 Feb 1995). Order Number DE95060082. Source: OSTI; NTIS; GPO Dep.

A new experimental technique has been devised to measure residual stresses in ductile materials with a combination of laser speckle pattern interferometry and spot heating. The speckle pattern interferometer measures in-plane deformations while the heating provides for very localized stress relief. The residual stresses are determined by the amount of strain that is measured subsequent to the heating and cool-down of the region being interrogated. A simple lumped parameter model is presented to provide a description of the method. This description is followed by presentations of the results of finite element analyses and experimental results with uniaxial test specimens. Excellent agreement between the experiments and the computer analyses were obtained.

2203 Fuel Elements

Refer also to citation(s) 7291, 7645, 7659, 7668, 7669, 7670, 7671, 7672, 7676, 7772, 7786

7698 (ANL/TD/CP–85108) **Comparison of irradiation behavior of different uranium silicide dispersion fuel element designs.** Hofman, G.L.; Rest, J.; Snelgrove, J.L. Argonne National Lab., IL (United States). [1995]. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9409107–6: International meeting on reduced enrichment for research and test reactors, Williamsburg, VA (United States), 18-22 Sep 1994). Order Number DE95004584. Source: OSTI; NTIS; INIS; GPO Dep.

Calculations of fuel swelling of U_3SiAl-Al and U_3Si_2 were performed for various dispersion fuel element designs. Breakaway swelling criteria in the form of critical fuel volume fractions were derived with data obtained from U_3SiAl-Al plate irradiations. The results of the analysis show that rod-type elements remain well below the pillowing threshold. However, tubular fuel elements, which behave essentially like plates, will likely develop pillows or blisters at around 90% ^{235}U burnup. The U_3Si_2-Al compounds demonstrate stable swelling behavior throughout the entire burnup range for all fuel element designs.

7699 (FEI–2217) **Technique for calculating temperature conditions for fuel elements with bilateral heat removal taking into account axial heat fluxes.** Boltenko, Eh.A.; Ganina, S.M.; Zinina, G.A. Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk (Russian Federation). Fiziko-Ehnergeticheskij Inst. 1992. 22p. (In Russian). Order Number DE95612810. Source: OSTI; NTIS (US Sales Only); INIS.

The technique for calculating a fuel element with bilateral heat generation taking into account axial heat fluxes is described. Some results of numerical investigations of fuel element temperature behavior under different coolant flow schemes and when varying operating parameters, fuel element thickness and its thermal conductivity coefficient are presented. It is demonstrated that the effect of axial heat fluxes on heat removal zone redistribution and fuel element temperature conditions respectively enchances with increasing the fuel element thickness and on thermal conductivity coefficient. 5 refs.; 11 figs.; 1 tab.

7700 (FEI–2238) **Constant system for by-channel thermal-hydraulic calculation of fuel assembly operational conditions in reactors with natural and mixed convection.** Bogatyrev, I.L.; Bogoslovskaya, G.P.; Zhukov, A.V.; Sorokin, A.P.; Titov, P.A. Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk (Russian Federation). Fiziko-Ehnergeticheskij Inst. 1992. 37p. (In Russian). Order Number DE95612811. Source: OSTI; NTIS (US Sales Only); INIS.

System of constants for mass, impulse and energy conservation equations (drag, mixing, heat transfer coefficients, azimuthal unquality of temperature) is reported in region with small Re number for wide range of geometrical assembly parameters. This system can be used in subchannel calculations of assemblies with natural and mixed convection under conditions with loss of flow accident. The formulae are compared with experimental data. 30 refs.; 12 figs.; 1 tab.

7701 (FEI–2240) **Numerical analysis of nonstationary temperature fields in central zones of nuclear reactor fuel assemblies.** Mikhin, V.I.; Fetisova, L.N. Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk (Russian Federation). Fiziko-Ehnergeticheskij Inst. 1992. 22p. (In Russian). Order Number DE95612812. Source: OSTI; NTIS (US Sales Only); INIS.

In order to develop approaches to generalization of the nonstationary heat exchange data and to obtain the approximate thermal-model-testing criteria the numerical investigations of the nonstationary temperature patterns in the central zones of the nuclear reactor fuel assemblies are performed. The fuel assemblies of fast and water-cooled reactors with the different fuel compositions are investigated. The temperature patterns are found for instantaneous change in energy release and for steady coolant flow. 4 refs.; 11 figs.; 1 tab.

7702 (IAEA-TECDOC–766) **Safe handling, transport and storage of plutonium. Proceedings of a technical committee meeting held in Vienna, 18-21 October 1993.** International Atomic Energy Agency, Vienna (Austria). Oct 1994. 120p. (CONF-9310405–: Technical committee meeting on safe handling, transport and storage of plutonium, Vienna (Austria), 18-21 Oct 1993). Order Number DE95614900. Source: OSTI; NTIS (US Sales Only); INIS.

Plutonium inventories and utilization rates worldwide are growing. It is important for nuclear power programmes everywhere that no incidents or accidents with plutonium occur. It is therefore important that all who deal with plutonium, do so safely. All those who deal with plutonium should have available the best information on safety handling and storage. Several countries have mature plutonium programmes. However, information exchange on plutonium has been limited. This has precluded the development until now of consensus documentation on safe handling and storage of plutonium. The Technical Committee has been established to address these problems and this Technical Document is the first product in this process. The purpose of the meeting was to bring together experts with significant experience in handling, transporting and storing plutonium; to exchange information and experiences dealing with plutonium at their facilities; to describe their practices (guidelines, procedures, regulations, etc.) for safely dealing with plutonium; to assess the need to develop and publish a consensus plutonium safety practices document(s), and to recommend possible future IAEA activities in this technical area. Refs, figs and tabs.

7703 (IAEA-TECDOC–766, pp. 11-19) **Some safety aspects related to MOX fuel fabrication in Belgium.** Canck, H. de (Belgonucleaire, Arendonk (Belgium). DECA Consulting). International Atomic Energy Agency, Vienna (Austria). Oct 1994. (CONF-9310405–: Technical committee meeting on safe handling, transport and storage of plutonium, Vienna (Austria), 18-21 Oct 1993). In *Safe handling, transport and storage of plutonium. Proceedings of a technical committee meeting held in Vienna, 18-21 October 1993.* 120p. Order Number DE95614900. Source: OSTI; NTIS (US Sales Only); INIS.

The demand for MOX fuel is high, leading Belgonucleaire to plan an expansion to the MOX fabrication facility from the present annual throughput of 35 t HM to 70-75 t HM by the end of the century. The plutonium isotopic composition has changed over time with more ^{238}Pu and ^{241}Pu arising from higher burnup fuels. Greater heat, neutron, and gamma/xray shielding problems result. Radiation exposure protection for plant personnel is made more difficult: by stricter ICRP standards, from increased radiation weighting factors for neutrons, by changing isotopics of plutonium loadings in fuel. Programmes are being implemented to limit individual maximum dose to less than 20 mSv/year and to lower the mean dose to 5 mSv/year. These limits are being approached. Safety is continuously practiced with special efforts to avoid criticality and accidents - personnel information and training is most important. (author). 4 figs, 3 tabs.

7704 (KAERI/RR–1247/93) **The development of nuclear fuel for the future.** Sohn, Dong Seong; Kim, Shi Hwan; Lim, Kap

Soon; Yang, Myeong Soon; Lee, Yeong Uh; Kim, Yeong Jin; Ju, Hyeong Kook; Oh, Soo Yeol; Kim, Yeong Il; No, Jae Man; Lee, Jae Kyeong; Koo, Yang Heon; Song, Keun Uh; Lee, Hee Seong; Kim, Keung Koo; Jeong, Hyeong Kook;Korea Cancer Center Hospital, Seoul (Korea, Republic of). May 1993. 41p. (In Korean). Order Number DE95612813. Source: OSTI; NTIS; INIS.

Goal is to develop nuclear fuels which can improve the safety and economics of nuclear power generation and enhance the effective use of uranium resources. The fuels are aimed for successive power plants after the year 2000. To achieve these goals, it is necessary to analyse characteristics of advanced concept fuels based on currently available fuel design and manufacturing technology and to establish new design and manufacturing technology for the new concept fuels. This first year of the project focused on 1) technical feasibility evaluation of application of existing technology to advanced concept fuel such as extra-high BU fuel or other improved feature fuel, 2) analysis of domestic and foreign circumstances for advanced concept fuel development and drawing-out of plans for its development, and 3) securing of basic technology for development. For analysis of nuclear fuel characteristics, expected change in design parameters at high BU has been evaluated and fuel cycle evaluation models were improved for development of fuel cycle strategy with high BU fuel. For verification and improvement of design methodology, technical feasibility of application of the existing nuclear design system to advanced fuel has been analysed and thermal-hydraulic analysis methodology is under improvement for more thermal design margin. For review of state-of-the-art and study of developmental plans, trends and circumstances of nuclear fuel development in foreign countries have been analysed and several domestic developmental plans were identified. For development of advanced nuclear fuel fabrication technology, preliminary experiments for mixing of additives with UO_2 powder were performed and state-of-the-art of new fabrication techniques which are under development in recent years were analysed.

2204 Control Systems

Refer also to citation(s) 7642, 7644, 8336, 9197

7705 (DPW–55-17-23) **100 Areas weekly report, June 9, 1955.** Bellas, H.W. Du Pont de Nemours (E.I.) and Co., Wilmington, DE (United States). Explosives Dept. 9 Jun 1955. 3p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-76SR00001. (SR/H–857). Order Number DE95002435. Source: OSTI; NTIS; GPO Dep.

Short communication. SPECIAL PRODUCTION REACTORS/ operation; OPERATION; REACTOR CONTROL SYSTEMS; REACTOR FUELING; SHIELDING; REACTOR SAFETY

7706 (EUROSIM–94-10) **FASMON monitoring of space dependent oscillations in a BWR.** Bergdahl, B.G.; Oguma, R. EuroSim AB, Nykoeping (Sweden). 4 Aug 1994. 21p. Order Number DE95612819. Source: OSTI; NTIS; INIS.

BWR-instabilities can occur in fundamental mode with in-phase core wide oscillations or in excited modes as out-of-phase oscillations. The fundamental mode can be successfully monitored with DR (Decay Ratio) and amplitude calculations while the out-of-phase oscillations demands phase analysis between the LPRM-signals in different parts of the core. The present report describes how the BWR-stability monitor FASMON detects such excited modes and presents the topology of the flux swing in a horizontal plane in the core. FASMON is the only available method to detect out-of-phase oscillations fast (within 20 seconds) and robust. The FASMON algorithm is based on adaptive recursive filtering technique. All investigations with FASMON presented in this report show that the software is a good monitor tool. The software makes surveillance of the phase differences and amplitudes for a number of LPRM signals. The method to calculate the phase differences is robust with the following characteristics: The response time within 20 seconds for the FASMON algorithm is very short; Robust - works even under transient conditions; Independent of the signal amplitude; A dead sensor in a LPRM-pair does not cause alarm. The report gives results from investigations using FASMON both on theoretical and measured signals. As a conclusion the investigation of the instability shows that FASMON works even under circumstances with in-phase conditions and low amplitude up to unstable conditions with out-of-phase oscillations and high amplitude. 5 refs, 12 figs.

7707 (FRCEA-TH–407) **Reliability studies by fast electronic simulation. Realization of an apparatus of configuration made by computer in function of the model to study.** Jurvillier, I. CEA Centre d'Etudes de Valduc, 21 - Is-sur-Tille (France); Dijon Univ., 21 (France). 5 Sep 1991. 110p. (In French). Order Number DE95613318. Source: OSTI; NTIS (US Sales Only); INIS.

Here is a reliability study concerning nuclear facilities; from the operating system scheme studies lead to the elaboration of an apparatus called ESCAF, actually commercialized, allowing the analysis of the most complex systems. These studies were made at the demand of safety evaluation services of the CEA who have to give a technical advice to the authorities able to deliver the authorization of building and operating nuclear power plants.

7708 (IA–1486, pp. 161) **Computerized central control and supervision room.** Arad, M.; Hollander, M.; Oren, J. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. NEGEV NUCLEAR RESEARCH CENTER/ computerized control systems; DISPLAY DEVICES; MANAGEMENT; MONITORING; REACTOR CONTROL SYSTEMS; REACTOR MONITORING SYSTEMS; REAL TIME SYSTEMS

7709 (IAEA-TECDOC–762) **Operator support systems in nuclear power plants. Proceedings of a specialists meeting held in Moscow, Russian Federation, 17-21 May 1993.** International Atomic Energy Agency, Vienna (Austria). Sep 1994. 305p. (CONF-9305401–: Specialists meeting on operator support systems in nuclear power plants, Moscow (Russian Federation), 17-21 May 1993). Order Number DE95615882. Source: OSTI; NTIS (US Sales Only); INIS.

The 60 participants, representing 17 Member States, reviewed recent developments and discussed directions for future efforts in the area of computerized systems for operator support in nuclear power plants. During the meeting 31 papers were presented covering the wide spectrum of technical and scientific subjects including recent experience and benefits with operator support systems (OSS), design and implementation of OSSs, human aspects of introducing OSSs, qualification verification, validation and licensing, and international co-operation. Refs, figs and tabs.

7710 (IAEA-TECDOC–762, pp. 11-17) **Westinghouse computer-based operator support systems.** Richelle, G. (Westinghouse Energy Systems Europe, Brussels (Belgium)); Boucau, J.; Carrera, J.; Nguyen, T. International Atomic Energy Agency, Vienna (Austria). Sep 1994. (CONF-9305401–: Specialists meeting on operator support systems in nuclear power plants, Moscow (Russian Federation), 17-21 May 1993). In *Operator support systems in nuclear power plants. Proceedings of a specialists meeting held in Moscow, Russian Federation, 17-21 May 1993.* 305p. Order Number DE95615882. Source: OSTI; NTIS (US Sales Only); INIS.

Modern plant computers provide access to large number of plant measured/calculated data, which can be used to support the operator's work in the control room. This paper provides an overview of three support systems developed by Westinghouse: Advanced Alarm Management System (AWARE), Revolutionary Core Monitoring Program (BEACON), and Computerized Procedures Package (COMPRO). The AWARE alarm management system, originally designed to be part of the Advanced Control Room design for future nuclear plants, has been tailored for backfit to operating plants and can be installed during a single plant outage. One design goal of the system is to have no alarm in the control room following a reactor trip, as long as the systems are behaving as designed. AWARE can be installed as a full backfit or as a partial backfit using existing annunciator tiles, or provide separate alarm treatment to the plant computer. BEACON is a core monitoring, analysis, and prediction tool that provides unparalleled power for understanding and planning core operation. It calculates three-dimensional core power distributions on-line, using an advanced core model. The core model always agrees with actual operation because it is continuously updated with measurements from conventional plant instrumentation. Power distribution information is visualized through

advanced color graphics to provide users with immediate feedback and comprehensive understanding of core behaviour. COMPRO supports the operator in application of plant procedures and utilizes written procedures as basis for textual displays, prompting the operator to the actions to take and providing relevant information about the state to plant parameters. This system guides the user step by step through the plant procedures by monitoring appropriate plant data and identifying the recommended course of action. Parallel information is provided.

7711 (IAEA-TECDOC–762, pp. 19-27) **TIS process supervisory local area network (LAN).** Treflik, L. (Jaslovske Bohunice Nuclear Power Plant, Jaslovske Bohunice (Slovakia)); Sitar, Z. International Atomic Energy Agency, Vienna (Austria). Sep 1994. (CONF-9305401–: Specialists meeting on operator support systems in nuclear power plants, Moscow (Russian Federation), 17-21 May 1993). In *Operator support systems in nuclear power plants. Proceedings of a specialists meeting held in Moscow, Russian Federation, 17-21 May 1993.* 305p. Order Number DE95615882. Source: OSTI; NTIS (US Sales Only); INIS.

TIS - the process supervisory LAN was installed at both the NPP V-1 twin-units of WWER-440/230 type and the NPP V-2 twin-units of WWER-440/213 type at Jaslovske Bohunice, Slovak Republic, in 1992. It represents a superstructure to the existing reactor unit process computers RPP-16S and IV 500 MA at the NPP V-1 and IVS Komplex Uran 2M and KVRK at the NPP V-2. The principal goal of TIS is to supply both the main control room staff and the NPP operation personnel and operation mode engineers with process information in a larger extent and on a higher level than the existing process computers do. TIS provides following process supervision functions: Taking over Data, Data Processing, Operative and Historical Data Collection, Active Alarm Management, Mimic Diagrams, REAL-time and Historical Trending, Horizontal Bargraphs, Data Tables, Report Generation, Shift Supervisor Support in case of Failure/Accident at NPP, User Database Applications, Computerized Operating Procedures, Programmable Prompts to Operator, "Desk-top" Calculator, Communication with Professional Departments, Auto-diagnostics. TIS is a PC local area network of QNX NET type, its data transmission rate being 2.5 Mbits/second. TIS is run under QNX operating system. Application software modules are written in QNX C and C-86 languages. Some functions were completed in OnCmd v.4.2 database environment. (author). 2 figs.

7712 (IAEA-TECDOC–762, pp. 29-42) **Experience and benefits with diagnostic systems in German PWRs.** Wach, D. (Institute for Safety Technology GmbH, Garching (Germany)). International Atomic Energy Agency, Vienna (Austria). Sep 1994. (CONF-9305401–: Specialists meeting on operator support systems in nuclear power plants, Moscow (Russian Federation), 17-21 May 1993). In *Operator support systems in nuclear power plants. Proceedings of a specialists meeting held in Moscow, Russian Federation, 17-21 May 1993.* 305p. Order Number DE95615882. Source: OSTI; NTIS (US Sales Only); INIS.

The detection of failures in safety relevant components at an early stage, i.e. already during power operation and in the incipient phase of the failure progress, is of valid interest for the plant operators. If there is enough time between the first indication of anomalies and the time when countermeasures have to be performed in order to avoid escalation of the defect or subsequent damages, the operator will be able to clarify the influencing parameters and to identify and diagnose the degree of the defect. Investigations and developments of early failure detection methods with emphasis on structural component integrity have been performed since many years in Germany. GRS/1ST has been deeply involved in these developments and has collected extensive operational experience from monitoring systems of reactor internals and primary circuit components in German NPPS. Computer-based systems for data analysis, feature trending and monitoring, signature display, documentation, and transmission of necessary analysis results to the central diagnosis Lab of 1ST have been established. The paper reports on the experiences with the use of such systems, and gives examples of successful failure diagnoses. The benefits of early failure detection and diagnostic systems are discussed with respect to safety and economic aspects. A proposal is made how to classify and use such systems in order to utilize the synergism of safety and availability motivations to earn their mutual benefit. (author). 14 refs, 13 figs.

7713 (IAEA-TECDOC–762, pp. 43-57) **Upgrading the VERONA core monitoring system.** Adorjan, F. (Atomic Energy Research Inst., Budapest (Hungary)); Buerger, L.; Lux, I.; Vegh, E.; Hamva, I.; Kalya, Z. International Atomic Energy Agency, Vienna (Austria). Sep 1994. (CONF-9305401–: Specialists meeting on operator support systems in nuclear power plants, Moscow (Russian Federation), 17-21 May 1993). In *Operator support systems in nuclear power plants. Proceedings of a specialists meeting held in Moscow, Russian Federation, 17-21 May 1993.* 305p. Order Number DE95615882. Source: OSTI; NTIS (US Sales Only); INIS.

The core monitoring system VERONA of the Hungarian Paks WWER-440 reactor has been upgraded in both the data acquisition hardware and data processing software components. The paper gives the outlines of the upgraded system with main emphasis on the services provided by the new Core Monitoring software system and the operator interface. It is concluded that the upgraded VERONA-u system is unique in its capabilities and services among the WWER core monitoring and data acquisition systems. (author). 10 refs, 1 fig.

7714 (IAEA-TECDOC–762, pp. 61-70) **On-line operator support system integrated with monitoring and diagnosis system.** Tuerkcan, E. (Netherlands Energy Research Foundation (ECN), Petten (Netherlands)); Ciftcioglu, O. International Atomic Energy Agency, Vienna (Austria). Sep 1994. (CONF-9305401–: Specialists meeting on operator support systems in nuclear power plants, Moscow (Russian Federation), 17-21 May 1993). In *Operator support systems in nuclear power plants. Proceedings of a specialists meeting held in Moscow, Russian Federation, 17-21 May 1993.* 305p. Order Number DE95615882. Source: OSTI; NTIS (US Sales Only); INIS.

An integrated Operator Support System (OSS) based on monitoring methodology has been built with the emphasis on monitoring carried out in real-time. The OSS is capable of identifying the abnormal functioning of the plant in terms of deviations from normality as well as sensor/signal failure as diagnostic information. For real-time monitoring, dynamic modelling of the plant plays an important role in the implementation. Each OSS component is described and its performance is illustrated by means of actual operational experience information from a nuclear power plant. (author). 12 refs, 6 figs.

7715 (IAEA-TECDOC–762, pp. 71-82) **CANDU operator decision support systems: Lessons learned and future directions.** Jones, P.E.R. (Atomic Energy of Canada Ltd., Chalk River, ON (Canada). Chalk River Nuclear Labs.); Fiset, J.Y.; Lupton, L.R. International Atomic Energy Agency, Vienna (Austria). Sep 1994. (CONF-9305401–: Specialists meeting on operator support systems in nuclear power plants, Moscow (Russian Federation), 17-21 May 1993). In *Operator support systems in nuclear power plants. Proceedings of a specialists meeting held in Moscow, Russian Federation, 17-21 May 1993.* 305p. Order Number DE95615882. Source: OSTI; NTIS (US Sales Only); INIS.

AECL Research is conducting applied human factors and advanced technology R and D to enhance CANDU performance and safety. The focus has been to improve human performance through interfaces, alarm and advisor systems, and procedures that better match human capabilities to plant tasks. The program is being conducted in close collaboration with operating CANDU plants and, in this way, operational experience is fed back through research to plant retrofit and new designs. One project involves the development of a prototype Critical Safety Advisor System to assist CANDU operators manage events where station safety goals are threatened. The work is based on research conducted to determine the human factors issues in decision support systems. The belief is that proper attention to human factors will help determine the conceptual and detailed design of the system, and ensure that it is accepted by intended users for the tasks they have to perform. The development of the prototype involved a strong emphasis on human factors engineering in the form of task and usability analysis coupled with a rapid prototyping development approach. This approach proved useful in obtaining cooperation from qualified operators and station staff and has led to the successful transfer of

portions of the prototype to an on line system. (author). 22 refs, 4 figs.

7716 (IAEA-TECDOC–762, pp. 99-102) **Classification of NPP operator support systems and problems with their implementation.** Alpeev, A.S. (Scientific and Engineering Centre for Nuclear and Radiation Safety of the Russian Federation, Moscow (Russian Federation)). International Atomic Energy Agency, Vienna (Austria). Sep 1994. (CONF-9305401–: Specialists meeting on operator support systems in nuclear power plants, Moscow (Russian Federation), 17-21 May 1993). In *Operator support systems in nuclear power plants. Proceedings of a specialists meeting held in Moscow, Russian Federation, 17-21 May 1993.* 305p. Order Number DE95615882. Source: OSTI; NTIS (US Sales Only); INIS.

Operator support systems for NPP comprise a part of the power unit process control system. A classification of operator support systems, which is based on operator's goals, is discussed in this paper. In accordance with these goals, operator support systems are subdivided into four classes. There are also considered problems for every class of operator support systems. These problems are: validation of operator support systems; safety analyses of their application; operator support system functioning and sharing of responsibilities; training of NPP operators. (author).

7717 (IAEA-TECDOC–762, pp. 103-111) **Forecast reactivity program for complex loadings.** Krasnukha, S.V. (South Ukraine Nuclear Power Plant, Juzhnoukrainsk (Ukraine)). International Atomic Energy Agency, Vienna (Austria). Sep 1994. (CONF-9305401–: Specialists meeting on operator support systems in nuclear power plants, Moscow (Russian Federation), 17-21 May 1993). In *Operator support systems in nuclear power plants. Proceedings of a specialists meeting held in Moscow, Russian Federation, 17-21 May 1993.* 305p. Order Number DE95615882. Source: OSTI; NTIS (US Sales Only); INIS.

The program is based on neutron-physics calculations by three dimension programs "BIPR7" and "ALBOM". Reactivity may be present as a sum of different components depending on different operation parameters. Matrix of the components is interpolated with spline for calculation of intermediate significance. Transient processes are calculated by point model depending on a thermal power and time of keeping this power. Control parameters are prepared during input stage and then reactivities are calculated for each parameter. At last, the sum of the reactivities is achieved and the critical concentration of CH3BO3 is calculated. Critical position of one of the control parameters, such as control rods, power and temperature, are to be found for each of the input conditions. The make-up can be carried our for each state and the change of concentration of CH3B03 found for three flow rates. All of the bases have graphical interface to control themselves by the neutronphysic materials. It is possible to switch the bases to each of power blocks of the station. One can output the calculated energetic fields as graphical picture for any time of the cycle. The results of this program application and the related conclusions will be present in this paper. The program is written in object-oriented language TUBO-PASCAL-6.0, and TUBO-VISION. The program requires IBM PC-AT/386 or 286 with DOS-5.0 or Windows, Mouse and 3.5 available memory on a hard disk. Time necessary to install the program is 15-10 minutes. (author). 2 refs, 6 figs.

7718 (IAEA-TECDOC–762, pp. 113-122) **NPPO - TINA: Expert system for supporting the operator's decision-making process.** Gieci, A. (Vyskumny Ustav Jadrovych Elektrarni, Trnava (Slovakia)); Mosny, J. International Atomic Energy Agency, Vienna (Austria). Sep 1994. (CONF-9305401–: Specialists meeting on operator support systems in nuclear power plants, Moscow (Russian Federation), 17-21 May 1993). In *Operator support systems in nuclear power plants. Proceedings of a specialists meeting held in Moscow, Russian Federation, 17-21 May 1993.* 305p. Order Number DE95615882. Source: OSTI; NTIS (US Sales Only); INIS.

Many incidents and accidents in the large technologies are beyond the automatic control. In these cases only quick operator's thinking and decision processes are able to manage the situation. In the control room instrumentation of the nuclear power plant there are no devices to aid operator's cognitive processes at present. Several attempts to fill up this gap employing the methods of artificial intelligence have been made. These systems support only a certain part of the decision process, mostly the state identification. The article gives an account of an expert system prototype NPPO-TINA developed to aid the whole operator's intellectual activity in his decision process. It is realized in the program environment TINA, intended for knowledge base systems development, using its hierarchical dynamic inference control. The system is designed for nuclear power plant operators in the Slovak and Czech Republic. (author). 5 refs, 6 figs.

7719 (IAEA-TECDOC–762, pp. 125-135) **The SPDS as a tool to improve post-accident strategy on WWER and RBMK reactors.** Boucau, J. (Westinghouse Energy Systems Europe, Brussels (Belgium)); Pelusi, J.; Reed, D. International Atomic Energy Agency, Vienna (Austria). Sep 1994. (CONF-9305401–: Specialists meeting on operator support systems in nuclear power plants, Moscow (Russian Federation), 17-21 May 1993). In *Operator support systems in nuclear power plants. Proceedings of a specialists meeting held in Moscow, Russian Federation, 17-21 May 1993.* 305p. Order Number DE95615882. Source: OSTI; NTIS (US Sales Only); INIS.

The purpose of this paper is to describe the Westinghouse Safety Parameter Display System (SPDS) design and its interaction with Emergency Response Guidelines (ERGs), as a comprehensive package covering post-accident strategy. Special emphasis will also be placed on the validation and verification of SPDS with a real-time thermal hydraulic tool. Special emphasis is placed on two applications that have been proposed to the Balakovo (WWER-1000) and Leningrad (RBMK) nuclear power plants as part of an overall program to improve safety. 1 fig.

7720 (IAEA-TECDOC–762, pp. 137-145) **The concept of an information support system for operational personnel of operating nuclear power plants.** Dounaev, V.G. (Consyst Co. Ltd, Moscow (Russian Federation)); Golovanov, V.V. International Atomic Energy Agency, Vienna (Austria). Sep 1994. (CONF-9305401–: Specialists meeting on operator support systems in nuclear power plants, Moscow (Russian Federation), 17-21 May 1993). In *Operator support systems in nuclear power plants. Proceedings of a specialists meeting held in Moscow, Russian Federation, 17-21 May 1993.* 305p. Order Number DE95615882. Source: OSTI; NTIS (US Sales Only); INIS.

The concept, which is discussed in the paper, specifies the purpose, status, tasks and functions of an information support system, requirements to the information and software provisions, as well as the scope and forms of displays. Quality assurance measures during the implementation phase on operating NPPs are also discussed. The concept was designed by the working group composed by the specialists of VNIIAES, Atomenergoproject, Gidropress, NIKIET and Consyst on the request of Concern Rosenergoatom. The primary objective of an information support system is to help an operator in the main control room to evaluate a safety status of a power unit and to take appropriate measures during normal operation, transients or, what is of utmost importance, in abnormal situations, design-basis and beyond-design-bases accidents. The first priority functions of operator aids, intended for the implementation at the operating NPPs, are a critical safety functions display, intellectual annunciation system, early fault detection and diagnosis. The system of information support can be implemented as a separate computer module, integrated in operating process control system of a power unit. The work on the implementation of an information support system is being carried out in the framework of modernization of operation process control system. (author). 4 refs.

7721 (IAEA-TECDOC–762, pp. 147-155) **Functional design bases for a safety parameter display system for WWER-type reactors.** Anikanov, S.S. (Consyst Co. Ltd, Moscow (Russian Federation)); Smirnov, S.P. International Atomic Energy Agency, Vienna (Austria). Sep 1994. (CONF-9305401–: Specialists meeting on operator support systems in nuclear power plants, Moscow (Russian Federation), 17-21 May 1993). In *Operator support systems in nuclear power plants. Proceedings of a specialists meeting held in Moscow, Russian Federation, 17-21 May 1993.* 305p. Order Number DE95615882. Source: OSTI; NTIS (US Sales Only); INIS.

The paper describes the basic features of the safety parameter display system (SPDS) for WWER-type reactor. During the realization of the system the major attention has been paid to the utilization of the existing computer facilities of the power unit instrumentation and control system. The notable feature of the proposed SPDS version for NPPs in Russia lies in the fact that while designing one should take into account beforehand the requirements of local and national Crisis Centers being a part of the general system for controlling NPP safe operation ("Garant"). Such an approach lead to the fact that on different levels of the SPDS implementation different numbers of critical safety functions (CSF) are used. Besides, in the system is widely used a set of formats representing functional relations among the safety parameters that allows to make easier the process of occurrence identification. (author). 8 figs.

7722 (IAEA-TECDOC–762, pp. 157-163) **The design concept of an on-line diagnosis system of a sophisticated technological object: The shell of expert diagnosis system "Dasha".** Adamov, E.O. (Research and Development Inst. of Power Engineering, Moscow (Russian Federation)); Glazov, O.N.; Eperin, A.P.; Strepetov, N.V. International Atomic Energy Agency, Vienna (Austria). Sep 1994. (CONF-9305401–: Specialists meeting on operator support systems in nuclear power plants, Moscow (Russian Federation), 17-21 May 1993). In *Operator support systems in nuclear power plants. Proceedings of a specialists meeting held in Moscow, Russian Federation, 17-21 May 1993.* 305p. Order Number DE95615882. Source: OSTI; NTIS (US Sales Only); INIS.

The paper presents a design concept of the on-line diagnosis system of any sophisticated technological object with an arbitrary nature of physical features. The software shell "DASHA" is developed based on the proposed concept with the use of the the "Table of failures" analysis method. It permits to design an expert diagnosis system of any sophisticated technological object. At present the expert on-line diagnosis system of main process equipment based on the "DASHA" shell is put into trial operation at Leningrad NPP-I. (author). 1 fig.

7723 (IAEA-TECDOC–762, pp. 165-176) **Generic information display system for the control centre of the nuclear power station power unit.** Tiapchenko, Y.A. (Institute of Aircraft Equipment, Zhukovsky (Russian Federation)). International Atomic Energy Agency, Vienna (Austria). Sep 1994. (CONF-9305401–: Specialists meeting on operator support systems in nuclear power plants, Moscow (Russian Federation), 17-21 May 1993). In *Operator support systems in nuclear power plants. Proceedings of a specialists meeting held in Moscow, Russian Federation, 17-21 May 1993.* 305p. Order Number DE95615882. Source: OSTI; NTIS (US Sales Only); INIS.

Over the last years much attention was given to the problem of man-machine interface management for the control systems of high risk object. Modular control panels with computerized display systems are proposed in a number of projects. Rejection of expanded mnemonics and transition to integrated mnemonics and automated workstations feature these projects. The implementation of such systems is related to the need to overcome a number of difficulties. The specialists is automated control systems (ACS) encountered the similar situation in astronautics and then in aviation. Therefore it is reasonable to take into consideration their experience while designing ACS or modifying operational ACS for the power units of atomic stations. In addition, the experience of soviet specialists in the field of astronautics is the most useful from our point of view. Information display systems of manned spacecrafts, starting with the "Vostok", substantially differed from those of aircraft and American spacecrafts. Compact consoles using command compression and multifunctional electronic displays and controls were proposed in place of expanded consoles. Based on the experience in astronautics the paper considers the problems of designing a console panel for the integrated IDS and consoles for the ACS of complex objects, including a power unit of the atomic power station. The power unit IDS is presented as an integrated shared system and the operators' workstations. The shared system consists of four levels to display a general status of the power unit; accidents related to the power unit safety; the main parameters and arrangements of the power unit; instruction of goal designations. The workstations have the four similar levels related to the reactor plant or turbine and additional levels to display particular parameters and limitations, routine control and critical situation isolation of a space station and the console of the operator's workstation. (author). 10 refs, 8 figs.

7724 (IAEA-TECDOC–762, pp. 177-184) **A double-channelled safety critical process visualization.** Schildt, G.H. (Technical Univ., Vienna (Austria). Inst. for Automation). International Atomic Energy Agency, Vienna (Austria). Sep 1994. (CONF-9305401–: Specialists meeting on operator support systems in nuclear power plants, Moscow (Russian Federation), 17-21 May 1993). In *Operator support systems in nuclear power plants. Proceedings of a specialists meeting held in Moscow, Russian Federation, 17-21 May 1993.* 305p. Order Number DE95615882. Source: OSTI; NTIS (US Sales Only); INIS.

This contribution presents a safety critical process visualization based on a double-channeled data processing system. Data processing for a safety critical process visualization is done by a double channeled microprocessor system applying the safe microprocessor system. Results from both microprocessor channels are monitored by a fail-safe comparator based on an antivalent function module. Additionally, process visualization is dynamized by a periodically operating switch connecting each display generation system to the screen. In case of any failures, corresponding process element symbols will be displayed blinking at a rate that corresponds to the switching rate. For colored displays ail additional color bar is installed to demonstrate that all used colors can be displayed. The fundamental idea for such a safety critical process visualization is to have a complete closed safety chain throughout the whole system, conceptually. Therefore, an operator is only allowed to perform safety critical operations in case of no-process-element-blinking. Commands given by an operator are protocolled on a control and failure printer, additionally, without any chance for data manipulation. (author). 5 refs, 8 figs.

7725 (IAEA-TECDOC–762, pp. 185-189) **Intelligence operator support system.** Anosov, A.I. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow (Russian Federation). Inst. Atomnoj Ehnergii); Ahmadeev, R.G.; Dubkov, S.L.; Sivakov, A.A.; Khazanovich, I.M. International Atomic Energy Agency, Vienna (Austria). Sep 1994. (CONF-9305401–: Specialists meeting on operator support systems in nuclear power plants, Moscow (Russian Federation), 17-21 May 1993). In *Operator support systems in nuclear power plants. Proceedings of a specialists meeting held in Moscow, Russian Federation, 17-21 May 1993.* 305p. Order Number DE95615882. Source: OSTI; NTIS (US Sales Only); INIS.

The paper describes a system which is capable of discerning an onset of abnormal situations arising in the course of the NPP operation and providing recommendations to the operator in his control actions. The system represents a set of interrelated algorithm with two models. One is intended for automatic diagnostics of the functioning of the on-board "Topaz-2" type SNPP. The other can be used as a part of the automatic control system of the technological processes in the NPP. The software is intended for the implementation in the IBM-PC/AT compatible computers. (author). 3 figs.

7726 (IAEA-TECDOC–762, pp. 193-198) **Operation support systems in nuclear power plants. Diagnostic aids: Alarm logic systems.** Jimenez, A. (TECNATOM SA, Madrid (Spain)); Gilabert, J.E. International Atomic Energy Agency, Vienna (Austria). Sep 1994. (CONF-9305401–: Specialists meeting on operator support systems in nuclear power plants, Moscow (Russian Federation), 17-21 May 1993). In *Operator support systems in nuclear power plants. Proceedings of a specialists meeting held in Moscow, Russian Federation, 17-21 May 1993.* 305p. Order Number DE95615882. Source: OSTI; NTIS (US Sales Only); INIS.

Potential demand for the improvement of conventional annunciator systems has long been one of the major technical issues in the nuclear power plant control room design. The microprocessor-based systems can provide capabilities such as alarm logic, programmable assignment of alarms inputs to annunciators windows and communications with other systems that can significantly

improve the processing and display of alarm information to the operator. The main emphasis for the implementation of computerized monitoring systems has been the support of operators by showing just the necessary information. This paper describes the results of project, called Alarm Logic System, and which is an attempt to deal with a problem of information display and interpretation by the operator, using the existing software capabilities in the control room process computer. (author). 1 fig.

7727 (IAEA-TECDOC–762, pp. 199-205) **SPDS development for an RBMK unit.** Gorelov, A.I. (Research and Development Inst. of Power Engineering, Moscow (Russian Federation)); Mikhailov, M.N.; Proshin, V.A.; Sazonov, N.P. International Atomic Energy Agency, Vienna (Austria). Sep 1994. (CONF-9305401–: Specialists meeting on operator support systems in nuclear power plants, Moscow (Russian Federation), 17-21 May 1993). In *Operator support systems in nuclear power plants. Proceedings of a specialists meeting held in Moscow, Russian Federation, 17-21 May 1993.* 305p. Order Number DE95615882. Source: OSTI; NTIS (US Sales Only); INIS.

Serious upgrades and improvements are made and planned in Russia to enhance safety of the nuclear power plants with the RBMK-reactor types. An important part of these measures is improvement in the area of safety parameters' presentation. Safety Parameters Display System is developed for implementation on the plants and on the special services for nuclear safety surveillance and management, on the operation support centers. The SPDS development and implementation are made within and with the large scale actions (which include I and C systems upgrades) towards enhance safety and reliability of RBMK nuclear plants in Russia. This fact influence upon work schedule and requires special efforts to co-ordinate various types of activities. There are many features on this type of reactor that determine detailed set of the safety parameters and functions. Main of these features and existent I and C and MCR are described. Safety parameters are grouped into three levels; besides that number of channels' parameters is decreased by means of calculations. SPDS functional and technical requirements are developed on the basis of deep knowledge of the plant features, safety parameters' list, operational experience, instructions and task analysis. Special group of specialists is involved to solve "human factor" problems. We believe that Westinghouse new computer technology and SPDS design and implementation experience would used. (author).

7728 (IAEA-TECDOC–762, pp. 207-216) **A model based diagnostic system for the identification of malfunctioning components using a constraint propagation paradigm.** Ha Jaejoo (Korea Atomic Energy Research Inst., Taejon (Korea, Republic of)); Hajek, B.K.; Miller, D.W. International Atomic Energy Agency, Vienna (Austria). Sep 1994. Contract DE-FG07-88ER12819. (CONF-9305401–: Specialists meeting on operator support systems in nuclear power plants, Moscow (Russian Federation), 17-21 May 1993). In *Operator support systems in nuclear power plants. Proceedings of a specialists meeting held in Moscow, Russian Federation, 17-21 May 1993.* 305p. Order Number DE95615882. Source: OSTI; NTIS (US Sales Only); INIS.

A commonly recognized failing of traditional rule-based diagnostic expert systems is the inability to recognize problems outside the range of expertise. In turn, the capability of such expert systems is limited to well-known problems. Contrary to the traditional approach, a model-based system has a potential to diagnose unexpected malfunctions. In this paper, a model-based diagnostic system for the isolation of malfunctioning components using constraint propagation paradigm - the CBDS, the Constraint Based Diagnostic System - is presented. The CBDS consists of (1) symbolic representation of plant model as a knowledge base, and (2) constraint propagation paradigm as a diagnostic inference engine. In the CBDS, a plant model contains information about intended behaviour of components that are organized in a component model library, as well as information about how the components are interconnected. As a diagnostic inference engine, the CBDS uses the general idea of model-based diagnosis to identify malfunctioning components. (author). 15 refs, 8 figs.

7729 (IAEA-TECDOC–762, pp. 217-221) **Creation of a computerized operator support system at Unit 5 of the Novovoronezh Nuclear Power Plant.** Scorodumov, V.A. (Novovoronezh Nuclear Power Plant, Novovoronezh (Russian Federation)). International Atomic Energy Agency, Vienna (Austria). Sep 1994. (CONF-9305401–: Specialists meeting on operator support systems in nuclear power plants, Moscow (Russian Federation), 17-21 May 1993). In *Operator support systems in nuclear power plants. Proceedings of a specialists meeting held in Moscow, Russian Federation, 17-21 May 1993.* 305p. Order Number DE95615882. Source: OSTI; NTIS (US Sales Only); INIS.

The issues discussed are: the condition for interaction of the subject and object of management, ensuring safe and reliable plant operation, and a need for operator support system (OSS) installation to satisfy this condition; the objective prerequisites existing at the Novovoronezh NPP for OSS development and installation at the Novovoronezh Unit 5; the adopted approaches to a step-by-step implementation, basing on "from-simple-to complex" concept, using a unified software with the most user-friendly interface, which allows to solve the task of gradual user training, as well as OSS set-up and debugging without any interference with the plant performance; prospects for OSS configuration development in the course of increasing complication of the tasks being solved by the OSS. (author). 2 figs.

7730 (IAEA-TECDOC–762, pp. 223-225) **The development of WWER monitoring and diagnostic concept.** Kuzil, A.S. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow (Russian Federation). Inst. Atomnoj Ehnergii). International Atomic Energy Agency, Vienna (Austria). Sep 1994. (CONF-9305401–: Specialists meeting on operator support systems in nuclear power plants, Moscow (Russian Federation), 17-21 May 1993). In *Operator support systems in nuclear power plants. Proceedings of a specialists meeting held in Moscow, Russian Federation, 17-21 May 1993.* 305p. Order Number DE95615882. Source: OSTI; NTIS (US Sales Only); INIS.

Safety and efficiency of NPP operation is ensured to a great extent by the quality of implementation of a reactor monitoring and diagnostics. A complex of monitoring and diagnostic system (MDS) is planned to be implemented in operating WWER and those which are in the design phase. MDS is designed as a complex of weakly interconnected subsystems capable of further improvements and performing the assigned functions on a full scale (therefore, a subsystem incorporates detectors, communication lines, instruments, computer facilities and software). MDS design makes provisions for step-by-step development of basic subsystems. MDS being developed is proposed to be installed gradually in all operating NPPs with WWERs. (author). 1 fig., 1 tab.

7731 (IAEA-TECDOC–762, pp. 227-232) **Basic principles of providing operator information support for power plant control of the VPBER-600 reactor plant.** Novikov, V.V. (OKBM, Nizhny Novgorod (Russian Federation)); Pobedonostsev, A.B.; Shashkin, S.L. International Atomic Energy Agency, Vienna (Austria). Sep 1994. (CONF-9305401–: Specialists meeting on operator support systems in nuclear power plants, Moscow (Russian Federation), 17-21 May 1993). In *Operator support systems in nuclear power plants. Proceedings of a specialists meeting held in Moscow, Russian Federation, 17-21 May 1993.* 305p. Order Number DE95615882. Source: OSTI; NTIS (US Sales Only); INIS.

The paper presents basic principles of providing favorable information medium for personnel, including organization of operator support system. Basic decisions on organization of information presentation in main control room and technical means which are supposed to be used are considered. The report shows that operator support system is integrated in process control system, defines its place in a general scheme of information presentation. Taks of operators support system in various power plant operating modes are indicated. So, in power plant start-up mode operator support system given an operator an information on the mode and necessary procedures of control activities in accordance with operating schedule. During the plant power operation in the basic mode operator support system sends and operator messages about failures at the initial stage of their beginning on the basis of logical processing of operative and diagnostic information. On the basis of the information obtained an operator may undertake corresponding correction actions. In emergencies accompanied by additional number

of failures relative to the designed ones operators support systems gives an operator recommendations on beyond design accident control. The report also presents description of operator interacting with the support system. Basic principles of information presentation concerning operator support system are described. (author).

7732 (IAEA-TECDOC–762, pp. 235-243) **Development of an advanced man-machine system for Japanese PWR plants.** Satoh, T. (Mitsubishi Heavy Industries Ltd., Kobe (Japan). Kobe Shipbuilding and Engine Works); Kobashi, S.; Saito, M. International Atomic Energy Agency, Vienna (Austria). Sep 1994. (CONF-9305401–: Specialists meeting on operator support systems in nuclear power plants, Moscow (Russian Federation), 17-21 May 1993). In *Operator support systems in nuclear power plants. Proceedings of a specialists meeting held in Moscow, Russian Federation, 17-21 May 1993.* 305p. Order Number DE95615882. Source: OSTI; NTIS (US Sales Only); INIS.

Advanced Man Machine System for Japanese PWR plants (MMS - PWR) is a prototype system of the operator supporting system that has been developed by Mitsubishi Heavy Industries, Ltd., Mitsubishi Electric Co. and Mitsubishi Atomic Power Industries, Inc. for five years from 1987 to 1991, under the financial support of MITI (the Ministry of International Trade and Industry of Japanese government). The aim of this system development is to further increase operation reliability and operability of PWR plants. For this purpose the knowledge engineering and the up-to-date computer technologies have been introduced into the design of a prototype system that can offer the information, infer and judge according to operator's thinking process in grasping the plant status and the operations. Also the system has been verified. A prototype system has the following supporting functions: (1) Operator Supporting Function for Normal Operation: Flexible operator supporting function for re-start-up and load following operation that will be needed for Japanese PWR plants in the future. (2) Operator Supporting Function for Abnormalities and Accidents: Early detection and identification of abnormality or accident of the plant, and guidance to appropriate countermeasures. (3) Operator Supporting Function for Maintenance: Supporting function for evaluation of the influence of maintenance on plant components, as well as for the isolation and restoration procedures during plant operation. (4) Optimum Operation Surveillance Function: Intelligence man machine interface that enables operators to understand various plant data precisely and offers the proper answers of what they need to know. (author). 6 figs, 2 refs.

7733 (IAEA-TECDOC–762, pp. 245-249) **Use of interview and inquiry procedures in design process for NPP control room upgrade.** Golovanev, V.E. (Research and Development Inst. of Power Engineering, Moscow (Russian Federation)); Gorelov, A.I.; Proshin, V.A. International Atomic Energy Agency, Vienna (Austria). Sep 1994. (CONF-9305401–: Specialists meeting on operator support systems in nuclear power plants, Moscow (Russian Federation), 17-21 May 1993). In *Operator support systems in nuclear power plants. Proceedings of a specialists meeting held in Moscow, Russian Federation, 17-21 May 1993.* 305p. Order Number DE95615882. Source: OSTI; NTIS (US Sales Only); INIS.

Major part of design activities for upgrade of NPP control rooms is using NPP personnel operating experience and participation of NPP personnel in detecting and solving the human factor problems. The ways of such participation include application of various human factors engineering and psychological techniques, for example interviews, inquiries (filling in questionnaire), operator activity observations. The present paper deals with activation of NPP personnel role in the design of control room upgrade, in particular, in creation of operator support systems. NPP personnel selection for incorporation in NPP upgrade group and initial training design skills are considered. NPP personnel responsibilities during particular stages of control room designing are specified. (author). 1 ref.

7734 (IAEA-TECDOC–762, pp. 251-260) **A severe accident simulator for the Paks Nuclear Power Plant.** Gyenes, G. (Atomic Energy Research Inst., Budapest (Hungary)); Maroti, L.; Vegh, E.; Vertes, P. International Atomic Energy Agency, Vienna (Austria). Sep 1994. (CONF-9305401–: Specialists meeting on operator support systems in nuclear power plants, Moscow (Russian Federation), 17-21 May 1993). In *Operator support systems in nuclear power plants. Proceedings of a specialists meeting held in Moscow, Russian Federation, 17-21 May 1993.* 305p. Order Number DE95615882. Source: OSTI; NTIS (US Sales Only); INIS.

This paper describes a Severe Accident Simulator under development for the Paks Nuclear Power Plant (WWR-440/mod.213). This simulator will be used to study the core melting process and its radiological consequences. The paper presents the hardware/software structure of the simulator and the main characteristics of the modelling are also provided. At the end some preliminary results are also presented. (author). 11 refs, 8 figs.

7735 (IAEA-TECDOC–762, pp. 261-267) **Man-machine systems in the nuclear power industry.** Smutnev, V.I. (Novovoronezh Nuclear Power Plant, Novovoronezh (Russian Federation)). International Atomic Energy Agency, Vienna (Austria). Sep 1994. (CONF-9305401–: Specialists meeting on operator support systems in nuclear power plants, Moscow (Russian Federation), 17-21 May 1993). In *Operator support systems in nuclear power plants. Proceedings of a specialists meeting held in Moscow, Russian Federation, 17-21 May 1993.* 305p. Order Number DE95615882. Source: OSTI; NTIS (US Sales Only); INIS.

The model is discussed of a Nuclear Power Unit management by the "managing community", where any operator is on the one hand a subject of management in relation to the machine as an object of management, and on the other hand - an object of management by the hierarchic structure of the managing community. Contradictions are analyzed arising on the basis of the ambivalent operator position as well as possible ways to resolve them. Attempts are made of mathematical formalization of conditions for non-contradictory "managing community-machine" interaction. Theorems of Plant operations safety culture are proposed, based on the results obtained. (author). 3 refs, 2 figs.

7736 (IAEA-TECDOC–762, pp. 271-279) **Enhancement of verification and validation for nuclear reactors through artificial intelligence.** Turkcan, E. (Netherlands Energy Research Foundation (ECN), Petten (Netherlands)); Ciftcioglu, O. International Atomic Energy Agency, Vienna (Austria). Sep 1994. (CONF-9305401–: Specialists meeting on operator support systems in nuclear power plants, Moscow (Russian Federation), 17-21 May 1993). In *Operator support systems in nuclear power plants. Proceedings of a specialists meeting held in Moscow, Russian Federation, 17-21 May 1993.* 305p. Order Number DE95615882. Source: OSTI; NTIS (US Sales Only); INIS.

In parallel with the rapid advancements in computer technology, there is growing concern in application of computer-enhanced methodologies in human-machine integrated complex systems virtually for the same essential goals, namely: safe, reliable and cost effective operation. In this context, the relevant studies may have various focal points such as plant wide monitoring, verification and validation, fault diagnosis and so on. This work highlights the eminent role which artificial intelligence (AI) and AI-based methodologies can play in designing operational enhancement of nuclear power reactors with particular reference to verification and validation. (author). 11 refs, 3 figs.

7737 (IAEA-TECDOC–762, pp. 281-287) **Critical methodological issues in evaluation of operator support systems.** Tanabe, F. (Japan Atomic Energy Research Inst., Tokai, Ibaraki (Japan)). International Atomic Energy Agency, Vienna (Austria). Sep 1994. (CONF-9305401–: Specialists meeting on operator support systems in nuclear power plants, Moscow (Russian Federation), 17-21 May 1993). In *Operator support systems in nuclear power plants. Proceedings of a specialists meeting held in Moscow, Russian Federation, 17-21 May 1993.* 305p. Order Number DE95615882. Source: OSTI; NTIS (US Sales Only); INIS.

In evaluating new operator support system for NPP from the view point of assuring public safety, followings are key points to be taken account of: (a) Situation should include unfamiliar and unanticipated events. (b) Function should include unintended one. (c) Concerned human operator is expert to have been fully adapted to the new system. Those points make thorough evaluation difficult only with empirical methods and call for an integrated methodology of analytical and empirical methods. Critical issues are reviewed and a framework of an integrated methodology is discussed. (author). 15 refs, 4 figs.

7738 (IAEA-TECDOC–762, pp. 289-295) **Computer software review procedures.** Mauck, J.L. (Nuclear Regulatory Commission, Washington, DC (United States)). International Atomic Energy Agency, Vienna (Austria). Sep 1994. (CONF-9305401–: Specialists meeting on operator support systems in nuclear power plants, Moscow (Russian Federation), 17-21 May 1993). In *Operator support systems in nuclear power plants. Proceedings of a specialists meeting held in Moscow, Russian Federation, 17-21 May 1993.* 305p. Order Number DE95615882. Source: OSTI; NTIS (US Sales Only); INIS.

The paper presents a summary of the NRC criteria and review approach used for digital retrofit reviews. This description is not all inclusive of the questions asked and material reviewed and referenced, but does cover the major areas. The Nuclear Regulatory Commission (NRC) review performed on the hardware portion of the computer is consistent with that which has been performed for past analog systems. That is, our review of the computer hardware should lead to the conclusion that the appropriate 10 Code of Federal Regulation (CFR) 50 General Design Criteria (GDC) are met, including applicable Institute of Electronic and Electrical Engineers (IEEE) standards and the appropriate regulatory guides. In particular, IEEE-279-1971 requirements have to be met including manual initiation capabilities, control/protection system interactions, physical separation and independence and testability. The one area that is not sufficiently covered by the regulatory criteria used in past staff reviews was the validity, qualification level, and reliability of resident software. Standards and regulations have emerged which impose new guidance for independent V and V on software intended to be used to perform safety related functions. Acceptable system V and V has been recognized as a means to bridge the gap between known hardware safety requirements and the software qualification requirements needed for safety systems. These records will provide a mechanism for regulatory review and approval. (author).

7739 (IAEA-TECDOC–769) **Current practices and future trends in expert system developments for use in the nuclear industry. Report of a specialists meeting held in Tel Aviv, Israel, 11-15 October 1993.** International Atomic Energy Agency, Vienna (Austria). Oct 1994. 147p. (CONF-9310404–: Specialists meeting on current practices and future trends in expert system developments for use in the nuclear industry, Tel Aviv (Israel), 11-15 Oct 1993). Order Number DE95615814. Source: OSTI; NTIS (US Sales Only); INIS.

There are three major objectives of this report. Each relates to the development of expert systems which improve the safety and efficiency of nuclear facility operations. The first objective is to identify the major distinct applications of expert systems as they relate to nuclear safety. The second objective is to identify future expert system development trends in order to help anticipate emerging tools which may spark rapid development or identify trends which may hinder its growth. The third objective is to identify development challenges. Refs, figs and tabs.

7740 (IAEA-TECDOC–769, pp. 23-32) **Using knowledge based systems for rams analysis and on-line operator support of nuclear power plants.** Scheer, S. (Commission of the European Communities, Ispra (Italy). Joint Research Centre); Wilikens, M. International Atomic Energy Agency, Vienna (Austria). Oct 1994. (CONF-9310404–: Specialists meeting on current practices and future trends in expert system developments for use in the nuclear industry, Tel Aviv (Israel), 11-15 Oct 1993). In *Current practices and future trends in expert system developments for use in the nuclear industry. Report of a specialists meeting held in Tel Aviv, Israel, 11-15 October 1993.* 147p. Order Number DE95615814. Source: OSTI; NTIS (US Sales Only); INIS.

With the growing complexity of safety-critical industrial systems there is a need for computer-based tools which integrate different activities related to the layout of such systems and focussing on risk assessment in general. These activities should not only be applicable for early decision taking during the design phase but also allow an advanced maintenance over the whole life of an industrial system and even support on-line operator decision making. Thus such intended activities are embedded in an overall domain description flexible to adapt itself to different situations and extendible for any kind of additional information to attach to. On the other side, however, special applications running in the given domain should react to very specific contexts given by the user and keep their knowledge for themselves. Current research resulted in the development of a methodology (STARS) and an off-line tool (Plant Editor) with which advanced layout techniques, domain administration and extension, and an evaluation of a layout topology are combined. In particular, when using this tool one has a powerful expert system for the design and maintenance of nuclear power plants. In the second part of this paper a tool and methodology (FORMENTOR) for providing on-line decision support to operators is described. (author). 13 refs, 6 figs.

7741 (IAEA-TECDOC–769, pp. 33-45) **The status of application of neural networks in the nuclear industry.** Boger, Z. (Israel Atomic Energy Commission, Beersheba (Israel)). International Atomic Energy Agency, Vienna (Austria). Oct 1994. (CONF-9310404–: Specialists meeting on current practices and future trends in expert system developments for use in the nuclear industry, Tel Aviv (Israel), 11-15 Oct 1993). In *Current practices and future trends in expert system developments for use in the nuclear industry. Report of a specialists meeting held in Tel Aviv, Israel, 11-15 October 1993.* 147p. Order Number DE95615814. Source: OSTI; NTIS (US Sales Only); INIS.

Artificial neural networks (ANN) are now accepted as a very practical AI technique, used for many applications in various fields. The nuclear industry, although aware of the potential benefits of the application of ANN, is slow in accepting this technique in nuclear power plants (NPP) control rooms, even for operator advisory roles. However, the technique is now being considered for predictive maintenance systems of NPP components, and for support roles in non-safety related systems, such as load forecasting, water chemistry, fuel management and safeguards systems. Active research on the properties and possible applications of ANN in NPP's is carried out in universities and national laboratories in several countries. Training data is supplied by the nuclear industry, either as real NPP operating data or from full scale simulators. The ability to train large scale ANN is crucial to their successful implementation in real-life situations, enabling also the development of auto-associative ANN for real-time fault diagnostics. In a demonstration example of a simulated material transfer system with 50 components, an auto-associative ANN was able to sense immediately the presence of a fault during an operation, and diagnose correctly the faulty component. (author). 101 refs.

7742 (IAEA-TECDOC–769, pp. 55-68) **Qualitative processing of uncertainty, conflicts and redundancy in knowledge bases.** Zbytovsky, V. (Ustav Jaderneho Vyzkumu CSKAE, Rez (Czech Republic)). International Atomic Energy Agency, Vienna (Austria). Oct 1994. (CONF-9310404–: Specialists meeting on current practices and future trends in expert system developments for use in the nuclear industry, Tel Aviv (Israel), 11-15 Oct 1993). In *Current practices and future trends in expert system developments for use in the nuclear industry. Report of a specialists meeting held in Tel Aviv, Israel, 11-15 October 1993.* 147p. Order Number DE95615814. Source: OSTI; NTIS (US Sales Only); INIS.

This paper describes two techniques, created and implemented in the course of development of the real-time on-line expert system Recon at the Nuclear Research Institute at Rez, Czech Republic. The first of them is the qualitative processing of uncertainty, which is based on the introduction of the third logic value to logic data objects, and the credibility flag to arithmetic data objects. The treatment of the third value and credibility flags during the inference, the explanation method based on the graphic representation and the uncertainty processing during the explanation are also mentioned. The second technique, is a semantic checking of knowledge bases, which enables us to recover parts of the bases, that are meaningless, either because of an error during their implementation into a base, or because they are redundant. The paper includes the explanation of basic terms of this method, such as so called conflicts, K-group and K-situation. The two types of the conflict (dead-end and bubble) are also discussed. The paper also offers the complete mathematical apparatus, which the checking method is based on. (author). 4 refs, tabs.

7743 (IAEA-TECDOC–769, pp. 81-85) **SAMSON: Severe accident management system on-line network.** Silverman, E.B.

(ARD Corp., Columbia, MD (United States)). International Atomic Energy Agency, Vienna (Austria). Oct 1994. (CONF-9310404--: Specialists meeting on current practices and future trends in expert system developments for use in the nuclear industry, Tel Aviv (Israel), 11-15 Oct 1993). In *Current practices and future trends in expert system developments for use in the nuclear industry. Report of a specialists meeting held in Tel Aviv, Israel, 11-15 October 1993.* 147p. Order Number DE95615814. Source: OSTI; NTIS (US Sales Only); INIS.

SAMSON is a computational tool used by accident managers in the Technical Support Centers (TSC) and Emergency Operations Facilities (EOF) in the event of a nuclear power plant accident. SAMSON examines over 150 status points monitored by nuclear power plant process computers during a severe accident and makes predictions about when core damage, support plate failure, and reactor vessel failure will occur. These predictions are based on the current state of the plant assuming that all safety equipment not already operating will fail. SAMSON uses expert systems, as well as neural networks trained with the back propagation learning algorithms to make predictions. Training on data from an accident analysis code (MAAP - Modular Accident Analysis Program) allows SAMSON to associated different states in the plant with different times to critical failures. The accidents currently recognized by SAMSON include steam generator tube ruptures (SGTRs), with breaks ranging from one tube to eight tubes, and loss of coolant accidents (LOCAs), with breaks ranging from 0.0014 square feet (1.30 cm^2) in size to breaks 3.0 square feet in size (2800 cm^2). (author). 1 fig.

7744 (IAEA-TECDOC--769, pp. 93-101) **An expert system for diagnosing failures in the condensate system of the Laguna Verde Nuclear Power Plant.** Arellano, J. (Instituto de Investigaciones Electricas, Cuernavaca (Mexico)); Ramirez, E.; Galicia, Y. International Atomic Energy Agency, Vienna (Austria). Oct 1994. (CONF-9310404--: Specialists meeting on current practices and future trends in expert system developments for use in the nuclear industry, Tel Aviv (Israel), 11-15 Oct 1993). In *Current practices and future trends in expert system developments for use in the nuclear industry. Report of a specialists meeting held in Tel Aviv, Israel, 11-15 October 1993.* 147p. Order Number DE95615814. Source: OSTI; NTIS (US Sales Only); INIS.

An expert system for diagnosing faults and processing alarms during operation of the Condensate System of a boiling water reactor nuclear power plant is presented here. The main features of this system are its systematic knowledge acquisition methodology, based on Probabilistic Risk Analysis techniques, and an intelligent alarm prioritizing mechanism for generating optimal, very fast inference strategies. The main developing tool for was the GENESIS shell, a specific use tool developed by the authors of this paper. (author). 4 refs, 5 figs.

7745 (IAEA-TECDOC--769, pp. 103-112) **Application of artificial neural networks in estimation of probable accident causes in nuclear power plants.** Keter, A. (Israel Atomic Energy Commission, Beersheba (Israel)); Boger, Z. International Atomic Energy Agency, Vienna (Austria). Oct 1994. (CONF-9310404--: Specialists meeting on current practices and future trends in expert system developments for use in the nuclear industry, Tel Aviv (Israel), 11-15 Oct 1993). In *Current practices and future trends in expert system developments for use in the nuclear industry. Report of a specialists meeting held in Tel Aviv, Israel, 11-15 October 1993.* 147p. Order Number DE95615814. Source: OSTI; NTIS (US Sales Only); INIS.

An exploratory study was made to train an ANN to predict the probabilities of four causes of accidents (loss of coolant accident types), based on the time behaviour of three selected parameters (pressurizer pressure and level and containment humidity). 316 time scenarios have been generated, with the cause probabilities calculated by Bayesian procedures. Four ANN models were trained by the TURBO-NEURON 1.1 software package on a basis of 251 cases to predict the cause probabilities of a particular accident scenario. The generalization capacity of the models was tested by comparing the results of the remaining 65 cases. It was found that the ANN models were able to classify correctly the original cause in 88% of the test cases, while the probability of correct prediction by random guess is 25%. This result is considered quite encouraging for further work, in view of the possibility to increase easily the number of training cases, with a consequent increase in the generalization capability. 19 refs, 1 fig.

7746 (IAEA-TECDOC--769, pp. 113-121) **Rex: A methodology used for the structured processing of nuclear power plant operation experience feedback, principles and extension to case based reasoning.** Malvache, P. (CEA Centre d'Etudes de Cadarache, 13 - Saint-Paul-lez-Durance (France)). International Atomic Energy Agency, Vienna (Austria). Oct 1994. (CONF-9310404--: Specialists meeting on current practices and future trends in expert system developments for use in the nuclear industry, Tel Aviv (Israel), 11-15 Oct 1993). In *Current practices and future trends in expert system developments for use in the nuclear industry. Report of a specialists meeting held in Tel Aviv, Israel, 11-15 October 1993.* 147p. Order Number DE95615814. Source: OSTI; NTIS (US Sales Only); INIS.

Rex project involves: A method for analyzing needs and identifying sources of experience; Procedures for constructing elementary pieces of experience from documents, data bases, or interviews; Procedures for building up a computer representation of the knowledge domain at stake; A software package which includes a multimedia interface, and a retrieval engine that produces information files on the basis of questions in natural language. An extension to a Case Based Reasoning system oriented toward operation diagnostic is presented. Rex is an experience management method that was initiated and developed by the CEA in order to preserve and make use of the experience gathered during nuclear reactors design and start-up phases. The objective of the initial application was to preserve the knowledge feedback on the start-up of the European fast reactor Super-Phenix. Recent studies point out that an increasing number of companies consider the management of their experience as a strategic concern. Capitalizing experience concerning NPP's operation becomes a key-factor in companies' competitiveness and in NPP's safety. After raising the problem of experience management, we describe the principle of an Experience Feed-back Cycle. Then the Rex approach is introduced as an organic answer to the functional requirements of the cycle. Finally, an extension to a Case Based Reasoning system oriented toward operation diagnostic is presented. 6 refs, 9 figs.

7747 (IAEA-TECDOC--769, pp. 137-144) **Nuclear power plant diagnostics using artificial neural networks.** Elias, E. (Israel Inst. of Technology, Haifa (Israel)); Wacholder, E.; Tramer, M. International Atomic Energy Agency, Vienna (Austria). Oct 1994. (CONF-9310404--: Specialists meeting on current practices and future trends in expert system developments for use in the nuclear industry, Tel Aviv (Israel), 11-15 Oct 1993). In *Current practices and future trends in expert system developments for use in the nuclear industry. Report of a specialists meeting held in Tel Aviv, Israel, 11-15 October 1993.* 147p. Order Number DE95615814. Source: OSTI; NTIS (US Sales Only); INIS.

Enhanced safety, reliability and operability of nuclear power plants may be achieved by the application of neural networks as a diagnostic tool to define the state of the plant at any given time. The paper presents a new neural network methodology, based on the backpropagation learning algorithm, for malfunctions management in nuclear power plants. It is shown that neural networks can be used for identifying the nonlinear dynamic behaviour of nuclear power plant components, and for isolating the origin and extent of a failure, when occurring, using consecutive samplings of sensors readings. (author). 21 refs, 5 figs.

7748 (KAERI/RR--1192/92) **Intelligent control and automation technology for nuclear applications.** Kim, Jae Hui (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Huh, Young Hwan; Lee, Jang Soo; Kim, Ko Ryeo; Cha, Kyoung Ho; Lee, Jae Cheol; Dong, In Sook. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jan 1993. 182p. (In Korean). Order Number DE95612820. Source: OSTI; NTIS; INIS.

This project intends to establish the basic technology of intelligent control and automation to be applied to the next generation nuclear plant. For that, the research status of those technologies is surveyed for various application areas at first. The characteristics and availability of those techniques such as neural network, fuzzy

rule based control and reasoning, multimedia, real-time software and qualitative modelling are studied through a series of simulations and experiments. By integrating each technologies studied above, we developed a hierarchical, intelligent control system for an autonomous mobile robot as a test bed. The system is composed of several modules of software and hardware subsystems, which are implemented by use of the intelligent techniques. Through the analysis of the results and experiences, we investigated the feasibility of application of the basic technology to the next generation plant. (Author).

7749 (KAERI/RR–1263/93) **A study on the application of the fuzzy logic controllers (II).** Moon, Byung Soo (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Lee, Byung Sun; Han, Kwang Soo; Moon, Jae Sun; Hong, Suk Boong; Choi, Yong Kil; Yoon, Ki Byung. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Dec 1993. 94p. (In Korean). Order Number DE95612852. Source: OSTI; NTIS; INIS.

We have studied how to generate a fuzzy logic controller whose output is identical to that of a given PI controller. Based on this study, we have analyzed what makes the fuzzy logic controller perform better than the PI controller. We have also designed and manufactured a laboratory equipment for the swell and shrink effects to the water level by opening and closing the steam dump valve. An analysis was performed on how the time delay effects are linked to the physical states of the steam. (Author).

7750 (KAERI/RR–1338/93) **The development of human factors experimental evaluation techniques -The development of human factors technologies-.** Sim, Bong Shick (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Oh, In Seok; Cha, Kyeong Ho; Lee, Hyun Chul. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Apr 1994. 157p. (In Korean). Order Number DE95612821. Source: OSTI; NTIS; INIS.

In the 2nd year of the research project for the development of human factors evaluation techniques, we first defined the experimental target systems by the comparison study of the advanced control rooms proposed by foreign countries in order to make the experiment feasible and realistic for the 10 experimental items selected in the first year of the project. Then we have decided to confine our research on the big board overview panel and operator workstations. Following the development of selection criteria for our research interest, we have identified the design variables which may influence the performance of the operator by the functional analysis. The experimental variables which will be used for the evaluation of the proposed items are then defined by the relational analysis between evaluation items and design variables and they are classified by the characteristics of the measurement data. The functional requirements of ITF are developed to accommodate the necessary functions for carrying out the 10 evaluation items. The functional requirements for each sub-system of ITF have been developed with the experimental paradigm of APTEA. Finally we have reviewed the compact nuclear simulator (CNS) at KAERI from the point of view of jyman factors guidelines/principles and proposed the two possible layouts for the experimental apparatus for the evaluation of display alternative and operational procedure. (Author).

7751 (PINSTECH–130) **Development of a new control software package for Pakistan Research Reactor-2.** Qazi, M.K. (Pakistan Inst. of Nuclear Science and Technology, Islamabad (Pakistan). Nuclear Engineering Div.). Pakistan Inst. of Nuclear Science and Technology, Islamabad (Pakistan). Nuclear Engineering Div. May 1993. 44p. Order Number DE95615883. Source: OSTI; NTIS (US Sales Only); INIS.

12 fig.

The development of a new control software package for Pakistan Research Reactor-2 is presented. The software operates in different modes which comprises of surveillance, pre-operational self tests, operator, supervisor and robotic control. The control logic critically damp the system minimizing power overshoots. The software, handles multiple abnormal conditions, provides an elaborate access control and maintains startup/shutdown record. The report describes the functional details and covers the operational aspects of the new control software. (author). 12 fig.

7752 (PNL-SA–19604) **Team interaction skills evaluation criteria for nuclear power plant control room operators.** Montgomery, J.C. (Pacific Northwest Lab., Richland, WA (United States)); Toquam, J.; Gaddy, C. Pacific Northwest Lab., Richland, WA (United States). Sep 1991. 9p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-9109160–6: 35. Human Factors Society (HFS) annual meeting, San Francisco, CA (United States), 2-6 Sep 1991). Order Number DE95004569. Source: OSTI; NTIS; INIS; GPO Dep.

Previous research has shown the value of good team interaction skills to group performance, yet little progress has been made on in terms of how such skills can be measured. In this study rating scales developed previously (Montgomery, et al., 1990) were extensively revised and cast into a Behaviorally Anchored Rating Scale (BARS) and a Behavioral Frequency format. Rating data were collected using 13 training instructors at the Diablo Canyon Nuclear Plant, who rated three videotapes of simulator scenario performance during a day-long training session and later evaluated control room crews during requalification training. High levels of interrater agreement on both rating scales were found. However, the factor structure of the ratings was generally inconsistent with that hypothesized. Analysis of training ratings using Cronbach's components of accuracy (Cronbach, 1955) indicated that BARS ratings generally exhibited less error than did the Behavioral Frequency ratings. The results are discussed in terms of both field and research implications.

2205 Environmental Aspects

Refer also to citation(s) 7785, 8165, 8499, 8508, 8620

7753 (Juel–2889) **Radiation exposure due to gamma-ray submersion.** Rohloff, F. Forschungszentrum Juelich GmbH (Germany). Abt. Sicherheit und Strahlenschutz; Technische Hochschule Aachen (Germany). Mar 1994. 115p. (In German). Order Number DE95738787. Source: OSTI; NTIS (US Sales Only); INIS.

The report explains the development of the mathematical foundations for calculation of the dispersion factors of gamma-ray submersion, and the calculations. The Gaussian model describing the dispersion quasi like a molecular diffusion is one of the starting points, the other is the point-kernel model for the transport of gamma rays, with radiation transport being treated as quasi optical, and build-up factors being used for describing the impact of interaction between gamma radiation and matter. The time-space continuum integration was to be done for calculation of the dispersion factor. The time integration was done first, and for the remaining space integration, the convergence problems were solved. (orig./HP)

7754 (KAERI/RR–1253/93) **Site selection of meteorological tower and environmental impact assessment of the cooling tower.** Lee, Young Bok (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Kim, Byeong Uh; Han, Moon Hee; Kim, Eun Han; Soe, Kyeong Seok; Hwang, Won Tae. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Oct 1993. 101p. (In Korean). Order Number DE95612549. Source: OSTI; NTIS; INIS.

Meteorological characteristics related to the site complexity should be considered to assess the impact on the surrounding environment due to the operation of cooling towers of the KMRR. Meteorological towers should be installed in positions representing the site complexity well. The purpose of this project is to assess the environmental impact due to vapor and drift released from cooling towers as well as to select optimal locations of meteorological towers.

7755 (KAERI/RR–1310/94) **Analysis of chemical factors affecting marine ecosystem around nuclear power plant.** Chun, Kwan Sik (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Choi, Yoon Dong; Chun, Ki Jeong; Kim, Jin Kyu; Jung, Kyeong Chai; Lee, Yeong Keun; Park, Hyo Kook. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jun 1994. 120p. (In Korean). Order Number DE95612553. Source: OSTI; NTIS; INIS.

The ecological data of the coastal area of Youngkwang nuclear power plant from 1987 to 1993 were comprehensively analyzed,

and various physical and chemical properties of sea water and sediments were measured. Major factors affecting phytoplankton standing crops were suspended substances, nitrate, and silicate. The contents of iron, chromium, copper, and sulfur in sediments sampled from the discharge channel were slightly higher than those in the other areas. In order to qantify the chemical impacts on marine ecosystem, it is desirable that a systematic survey be made through the whole year cycle to assure the consistency and confidence of the related data. (Author).

7756 (KAERI/RR–1331/93) **Development of computing code system for level 3 PSA -A study for nuclear safety improvement-.** Kim, Dong Ha (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Kim, Kil Yoo; Jeong, Jong Tae; Hwang, Mi Jeong. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jul 1994. 159p. (In Korean). Order Number DE95613327. Source: OSTI; NTIS; INIS.

Among the various atmospheric dispersion models, a Gaussian plume model was chosen for Level 3 PSA. The merits of this model are: cost-effectiveness in computing time, unnecessity of complicated atmospheric data, and the comparable output to the detailed computing codes for a flat terrain. In order to complement the simple nature of the Gaussian mode, corrections on the plume rise, the mixing height, the wet and dry deposition, and the radionuclide decay were documented. A stand-alone computer code was developed to simulate the atmospheric dispersion using the Gaussian plume model. Given the wind direction, the wind speed and the atmospheric stability, the code calculates the dispersion coefficient and the corresponding concentration of fission products in the air and on the ground surface. The effect of atmospheric stability change with transport distance is also incorporated into the code. Besides the simulation of atmospheric dispersion, a visualization technique is under development and the part of the results is shown here. When the model for the evaluation of fission product concentration is married with this visualization technique, this system can allow users to see the Level 3 PSA results easily on a PC screen. (Author).

7757 (KAERI/RR–1383/93) **A study on the ocean circulation and thermal diffusion near a nuclear power plant.** Shu, Kyung Suk (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Han, Moon Hee; Kim, Eun Han; Hwang, Won Tae. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Aug 1994. 106p. (In Korean). Order Number DE95612554. Source: OSTI; NTIS; INIS.

The thermal discharge used with cooling water at nuclear power plant is released to a neighbour sea and it is influenced on marine environment. The thermal discharge released from power plant is mainly transported and diffused by ocean circulation of neighbour sea. So the evaluation for characteristics of ocean circulation around neighbour sea is firstly performed. The purpose of this research is primarily analyzed the thermal diffusion in sea around Yongkwang nuclear power plant. For this viewpoint, fundamental oceanographic data sets are collected and analyzed in Yellow sea, west sea of Korea, sea around Yongkwang. The ocean circulation and the effects of temperature increase by thermal discharge are evaluated using these data. The characteristics of tide is interpreted by the analysis of observed tidal elevation and tidal currents. The characteristics of temperature and salinity is investigated by the long-term observation of Korea Fisheries Research and Development Agency and the short-term observation around Yongkwang. (Author).

7758 (PINSTECH–134) **Radiological consequence analysis for upgradation of Pakistan Research Reactor-1 from 9 to 10 MW.** Khan, L.A. (Pakistan Inst. of Nuclear Science and Technology, Islamabad (Pakistan). Nuclear Engineering Div.); Raza, S.S. Pakistan Inst. of Nuclear Science and Technology, Islamabad (Pakistan). Nuclear Engineering Div. Dec 1993. 30p. Order Number DE95615633. Source: OSTI; NTIS (US Sales Only); INIS.

Radiological consequence analysis has been carried out for upgradation of PARR-I from 9 to 10 MW. A hypothetical loss of coolant accident resulting in core meltdown and release of fission products to the atmosphere has been analyzed. Whole body and thyroid doses have been calculated as a function of time and distance from the containment building. Based on these dose estimates, boundaries of exclusion and low population zones are assessed. (author).

7759 (PINSTECH–136) **Environmental impact of Pakistan Research Reactor-2 following a hypothetical radiological release accident.** Qazi, M.K. (Pakistan Inst. of Nuclear Science and Technology, Islamabad (Pakistan). Nuclear Engineering Div.); Israr, M. Pakistan Inst. of Nuclear Science and Technology, Islamabad (Pakistan). Nuclear Engineering Div. Mar 1994. 20p. Order Number DE95615634. Source: OSTI; NTIS (US Sales Only); INIS.

7 fig.

The environmental impact of Pakistan Research Reactor-2 (PARR-2) following a hypothetical accident is presented. It is shown that with 100% core meltdown and multiple failures, PARR-2 does not pose any catastrophic consequences. Conservative estimates show that radiation levels in the Low Population Zone (LPZ) adjacent to the PARR-2 building, which in this case is the PINSTECH building, remains below the established limits. (author). 7 fig.

7760 (PNL–10286) **Atmospheric dispersion estimates in the vicinity of buildings.** Ramsdell, J.V. Jr.; Fosmire, C.J. Pacific Northwest Lab., Richland, WA (United States). Jan 1995. 49p. Sponsored by USDOE, Washington, DC (United States);Nuclear Regulatory Commission, Washington, DC (United States). DOE Contract AC06-76RL01830. Order Number DE95005753. Source: OSTI; NTIS; INIS; GPO Dep.

A model describing atmospheric dispersion in the vicinity of buildings was developed for the U.S. Nuclear Regulatory Commission (NRC) in the late 1980s. That model has recently undergone additional peer review. The reviewers identified four areas of concern related to the model and its application. This report describes revisions to the model in response to the reviewers concerns. Model revision involved incorporation of explicit treatment of enhanced dispersion at low wind speeds in addition to explicit treatment of enhanced dispersion at high speeds resulting from building wakes. Model parameters are evaluated from turbulence data. Experimental diffusion data from seven reactor sites are used for model evaluation. Compared with models recommended in current NRC guidance to licensees, the revised model is less biased and shows more predictive skill. The revised model is also compared with two non-Gaussian models developed to estimate maximum concentrations in building wakes. The revised model concentration predictions are nearly the same as the predictions of the non-Gaussian models. On the basis of these comparisons of the revised model concentration predictions with experimental data and the predictions of other models, the revised model is found to be an appropriate model for estimating concentrations in the vicinity of buildings.

2206 Research, Test, Training, Production, Irradiation, Materials Testing Reactors

Refer also to citation(s) 7308, 7309, 7310, 7426, 7533, 7688, 7705, 7751, 7754, 7759, 7785, 8391

7761 (ANL/TD/CP–85106) **Validation of the WIMSD4M cross-section generation code with benchmark results.** Deen, J.R. (Argonne National Lab., IL (United States)); Woodruff, W.L.; Leal, L.E. Argonne National Lab., IL (United States); Oak Ridge National Lab., TN (United States). [1995]. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38 ; AC05-84OR21400. (CONF-9409107–7: International meeting on reduced enrichment for research and test reactors, Williamsburg, VA (United States), 18-22 Sep 1994). Order Number DE95004586. Source: OSTI; NTIS; INIS; GPO Dep.

The WIMSD4 code has been adopted for cross-section generation in support of the Reduced Enrichment Research and Test Reactor (RERTR) program at Argonne National Laboratory (ANL). Subsequently, the code has undergone several updates, and significant improvements have been achieved. The capability of generating group-collapsed micro- or macroscopic cross sections from the ENDF/B-V library and the more recent evaluation, ENDF/B-VI, in the ISOTXS format makes the modified version of the WIMSD4 code, WIMSD4M, very attractive, not only for the RERTR

program, but also for the reactor physics community. The intent of the present paper is to validate the WIMSD4M cross-section libraries for reactor modeling of fresh water moderated cores. The results of calculations performed with multigroup cross-section data generated with the WIMSD4M code will be compared against experimental results. These results correspond to calculations carried out with thermal reactor benchmarks of the Oak Ridge National Laboratory (ORNL) unreflected HEU critical spheres, the TRX LEU critical experiments, and calculations of a modified Los Alamos HEU D_2O moderated benchmark critical system. The benchmark calculations were performed with the discrete-ordinates transport code, TWODANT, using WIMSD4M cross-section data. Transport calculations using the XSDRNPM module of the SCALE code system are also included. In addition to transport calculations, diffusion calculations with the DIF3D code were also carried out, since the DIF3D code is used in the RERTR program for reactor analysis and design. For completeness, Monte Carlo results of calculations performed with the VIM and MCNP codes are also presented.

7762 (ANL/TD/CP–85107) **Postirradiation examination of a low enriched U_3Si_2-Al fuel element manufactured and irradiated at Batan, Indonesia.** Suripto, A. (National Atomic Energy Agency, Serpong (Indonesia). Nuclear Fuel Element Center); Sugondo, S.; Nasution, H.; Hofman, G.L. Argonne National Lab., IL (United States). [1994]. 9p. Sponsored by USDOE, Washington, DC (United States);International Atomic Energy Agency, Vienna (Austria). DOE Contract W-31109-ENG-38. (CONF-9409107–5: International meeting on reduced enrichment for research and test reactors, Williamsburg, VA (United States), 18-22 Sep 1994). Order Number DE95004585. Source: OSTI; NTIS; INIS; GPO Dep.

The first low-enriched U_3Si_2-Al dispersion plate-type fuel element produced at the Nuclear Fuel Element Center, BATAN, Indonesia, was irradiated to a peak ^{235}U burnup of 62%. Postirradiation examinations performed to data shows the irradiation behavior of this element to be similar to that of U_3Si_2-Al plate-type fuel produced and tested at other institutions. The main effect of irradiation on the fuel plates is a thickness increase of 30–40 μm (2.5-3.0%). This thickness increase is almost entirely due to the formation of a corrosion layer (Boehmite). The contribution of fuel swelling to the thickness increase is rather small (less than 10 μm) commensurate with the burnup of the fuel and the relatively moderate as-fabricated fuel volume fraction of 27% in the fuel meat.

7763 (ANL/TD/CP–85125) **Relative performance properties of the ORNL Advanced Neutron Source Reactor with reduced enrichment fuels.** Bretscher, M.M.; Deen, J.R.; Hanan, N.A.; Matos, J.E.; Mo, S.C.; Pond, R.B.; Travelli, A.; Woodruff, W.L. Argonne National Lab., IL (United States). [1994]. 18p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9409107–4: International meeting on reduced enrichment for research and test reactors, Williamsburg, VA (United States), 18-22 Sep 1994). Order Number DE95004582. Source: OSTI; NTIS; INIS; GPO Dep.

Three cores for the Advanced Neutron Source reactor, differing in size, enrichment, and uranium density in the fuel meat, have been analyzed. Performance properties of the reduced enrichment cores are compared with those of the HEU reference configuration. Core lifetime estimates suggest that none of these configurations will operate for the design goal of 17 days at 330 MW. With modes increases in fuel density and/or enrichment, however, the operating lifetimes of the HEU and MEU designs can be extended to the desired length. Achieving this lifetime with LEU fuel in any of the three studies cores, however, will require the successful development of denser fuels and/or structural materials with thermal neutron absorption cross sections substantially less than that of Al-6061. Relative to the HEU reference case, the peak thermal neutron flux in cores with reduced enrichment will be diminished by about 25–30%.

7764 (BNL–52443) **Material unaccounted for at the Southwest Experimental Fast Oxide Reactor: The SEFOR MUF.** Higinbotham, W.A. Brookhaven National Lab., Upton, NY (United States). 7 Nov 1994. 20p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. Order Number DE95005653. Source: OSTI; NTIS; INIS; GPO Dep.

The U.S. Atomic Energy Commission contracted with the General Electric Company to design, construct, and operate the Southwest Experimental Fast Oxide Reactor (SEFOR) to measure the Doppler effect for fast neutron breeder reactors. It contracted with Nuclear Fuel Services to fabricate the fuel rods for the reactor. When the reactor went critical in May, 1969, it appeared that some of the mixed uranium-plutonium oxide (MOX) fuel rods did not contain the specified quantity of plutonium. The SEFOR operators soon found several fuel rods which appeared to be low in plutonium. The safeguards group at Brookhaven was asked to look into the problem and, if possible, determine how much plutonium was missing from the unirradiated rods and from the larger number which had been slightly irradiated in the reactor. It was decided that the plutonium content of the unirradiated and irradiated rods could be measured relative to a reference rod using a high resolution gamma-ray detector and also by neutron measurements using an auto-correlation circuit recently developed at the Naval Research Laboratory (NRL). During the next two years, Brookhaven personnel and C.V. Strain of NRL made several trips to the SEFOR reactor. About 250 of the 775 rods were measured by two or more methods, using a sodium-iodide detector, a high-resolution germanium detector, a neutron detector, or the reactor (to measure reactivity). The research team concluded that 4.6 $\pm$ 0.46 kg of plutonium was missing out of the 433 kg that the rods should have contained. This report describes the SEFOR experiment and the procedures used to determine the material unaccounted for, or MUF.

7765 (CONF-9404227–1) **Results of the MCNP analysis of 20/20 LEU fuel for the Oregon State University TRIGA Reactor.** Dodd, B.; Klein, A.C.; Lewis, B.R.; Merritt, P.A. Oregon State Univ., Corvallis, OR (United States). [1995]. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-92ER75747. From 14. TRIGA users conference; San Diego, CA (United States); Apr 1994. Order Number DE95003934. Source: OSTI; NTIS; GPO Dep.

The Monte Carlo Neutron/Photon (MCNP) code has been used to perform the neutronics analysis required to support revision of the Oregon State University TRIGA Reactor (OSTR) Safety Analysis Report (SAR). The SAR revision is a necessary part of the preparation of the application for authorization to convert the OSTR core from High Enriched Uranium (HEU) FLIP fuel to a Low Enriched Uranium (LEU) fuel. Before MCNP was applied to LEU-fueled cores, it was first validated by comparing MCNP calculations on FLIP cores to historical, measured values for these cores. The LEU fuel considered was the 20 wt%, 20% enriched (20/20) TRIGA fuel approved by the Nuclear Regulatory Commission (NRC) in NUREG 1282. The results show that the 20/20 fuel is much more reactive than FLIP fuel. A just-critical OSTR FLIP core contains 65 elements, while a just-critical 20/20 core only needs 51 elements. Similarly, the current operational FLIP core consists of 88 elements, whereas a 20/20 core giving the same core excess only requires 65 elements. This presents a significant problem for the OSTR because of potentially significant neutron flux loss in experimental facilities. Further analysis shows that to achieve a full size operational core of about 90 LEU elements the erbium content of the LEU fuel would need to be increased from 0.47wt% to about 0.85 wt%.

7766 (DOE/ER/79214–1) **Laboratory instrumentation modernization at the WPI Nuclear Reactor Facility.** Worcester Polytechnic Inst., MA (United States). [1995]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-93ER79214. Order Number DE95004440. Source: OSTI; NTIS; INIS; GPO Dep.

With partial funding from the Department of Energy (DOE) University Reactor Instrumentation Program several laboratory instruments utilized by students and researchers at the WPI Nuclear Reactor Facility have been upgraded or replaced. Designed and built by General Electric in 1959, the open pool nuclear training reactor at WPI was one of the first such facilities in the nation located on a university campus. Devoted to undergraduate use, the reactor and its related facilities have been since used to train two generations of nuclear engineers and scientists for the nuclear industry. The low power output of the reactor and an ergonomic

facility design make it an ideal tool for undergraduate nuclear engineering education and other training. The reactor, its control system, and the associate laboratory equipment are all located in the same room. Over the years, several important milestones have taken place at the WPI reactor. In 1969, the reactor power level was upgraded from 1 kW to 10 kW. The reactor's Nuclear Regulatory Commission operating license was renewed for 20 years in 1983. In 1988, under DOE Grant No. DE-FG07-86ER75271, the reactor was converted to low-enriched uranium fuel. In 1992, again with partial funding from DOE (Grant No. DE-FG02-90ER12982), the original control console was replaced.

7767 (DPW–55-16-39) **300-M Area weekly report, November 4–10, 1955, Savannah River Plant.** Bloomsburg, M.S. Du Pont de Nemours (E.I.) and Co., Wilmington, DE (United States). Explosives Dept. 10 Nov 1955. 3p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-76SR00001. (SR/H–845). Order Number DE95002378. Source: OSTI; NTIS; GPO Dep.

Short communication. SPECIAL PRODUCTION REACTORS/ production; SAVANNAH RIVER PLANT; PRODUCTION; FUEL CANS; NUCLEAR ENGINEERING; TESTING

7768 (INIS-mf–14437-Vol.3) **Vol. 3: Research and experimental reactors.** Bezpecnost Jadernych Zarizeni, no.4. Matejka, K. (ed.) (Ceske Vysoke Uceni Technicke, Prague (Czech Republic). Fakulta Jaderna a Fysikalne Inzenyrska); Fleischhans, J.; Hejzlar, R. No corporate text available. Jun 1994. 449p. (In Czech). Order Number DE95615954. Source: OSTI; NTIS (US Sales Only); INIS.

The various types of research, experimental and training reactors are described. In addition to their categorization with respect to various technical aspects and to reactor utilization, attention is paid to the research reactor fuel, to control and protection systems, neutron detectors, and dosimetric systems. (J.B.). 17 figs., 10 refs.

7769 (INIS-mf–14437-Vol.4-Pt.1) **Vol. 4: Technical descriptions of Czechoslovak research reactors. Part 1. Technical description of the LVR-15 reactor.** Bezpecnost Jadernych Zarizeni, no.4. Matejka, K. (ed.) (Ceske Vysoke Uceni Technicke, Prague (Czech Republic). Fakulta Jaderna a Fysikalne Inzenyrska); Fleischhans, J.; Hejzlar, R. No corporate text available. Jun 1994. 449p. (In Czech). Order Number DE95615955. Source: OSTI; NTIS (US Sales Only); INIS.

The main design and operating parameters of the LVR-15 research reactor are given and the reactor components are described, including the coolant circuits, coolant makeup and purification system, control and protection system, the UR 70 control rod, the electricity supply system, reactor ventilation system, IRT-2M type fuel, unirradiated fuel storage, irradiated fuel and radioactive waste handling, experimental equipment, and backup systems. Dosimetric protection of the reactor rooms is also dealt with. The reactor is accommodated in a pressureless vessel under a shielding lid, with forced cooling. IRT-2M fuel with 80% ^{235}U enrichment is used. The reactor is employed for loop and probe experiments, particularly for materials and physico-metallurgical research, experiments on horizontal channels, irradiating services, neutron activation analyses and neutron radiography, nuclear reactor operator training, and practical teaching exercises. (J.B.). 3 tabs., 11 figs., 6 refs.

7770 (INIS-mf–14437-Vol.4-Pt.3) **Vol. 4: Technical descriptions of Czechoslovak research reactors. Part 3. Technical description of the VR-1 reactor.** Bezpecnost Jadernych Zarizeni, no.4. Matejka, K. (ed.) (Ceske Vysoke Uceni Technicke, Prague (Czech Republic). Fakulta Jaderna a Fysikalne Inzenyrska); Fleischhans, J.; Hejzlar, R. No corporate text available. Jun 1994. 449p. (In Czech). Order Number DE95615956. Source: OSTI; NTIS (US Sales Only); INIS.

This part deals with the VR-1 training reactor operated by the Faculty of Nuclear Science and Physical Engineering, Czech Technical University in Prague. The UR-70 control rod and its involvement in the control facility are described. IRT-2M type fuel is employed in the reactor. The reactor control system is outlined. Attention is also paid to water management and water purification. The Am-Be neutron source of the reactor is described and its function explained. The dosimetric system, feed system, ventilation system, waste management system, and communication and backup systems are outlined as well. The experimental equipment of the reactor is described. (J.B.). 2 tabs., 8 figs., 41 refs.

7771 (KAERI/RR–1286/93) **A study on the decommissioning of research reactor.** Suh, Doo Whan (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Park, Sang Joon; Hong, Kwang Pyo; Sim, Byeong Seop. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jan 1993. 79p. (In Korean). Order Number DE95612943. Source: OSTI; NTIS; INIS.

As the result of study on decommissioning, discussion has made and data have been collected about experiences, plannings, and techniques for decommissioning through visit to GA and JAERI. GA supplied our Research Reactor No. 1 and No. 2, and JAERI made a memorial museum after dicommissioning of JRR-1 and is dismentling JPDR now. Also many kinds of documents are collected and arranged such as documents related to TRIGA reactor dicommissioning, 30 kinds of documents including decommissioning plan, technical criteria and related regulatory, and 1,200 kinds of facility description data. (Author).

7772 (KAERI/RR–1354/93) **Development of the nuclear fuel materials for research reactor -Development of the advanced nuclear materials-.** Kim, Chang Kyu (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Lee, Jong Tak; Park, Hee Dae; Kim, Ki Hwan; Hwang, Wan; Kim, Bong Koo; Ku, Yang Hyeon; Lim, In Cheol; Lee, Jae Kyeong; Kang, Yeong Hwan; Park, Jong Man; Jung, Heung Joon; Lee, DoKorea Cancer Center Hospital, Seoul (Korea, Republic of). Jul 1994. 332p. (In Korean). Order Number DE95612944. Source: OSTI; NTIS; INIS.

This project was carried out in order to localize the fuel production and to develop the atomized uranium silicide fuels. In the fabrication part, the fuel meat was successfully cladded with good contact between meat and clad through extrusion die modification and properly controlling of extrusion parameters. The electron beam welding parameters were established properly so that the strength of welding zone showed to be same as the clad strength. The fabricating and assembling technologies of the fuel assembly have been developed and applied to the fabrication of dummy fuels. The development of coating technology on the surface of graphite crucible reduced the carbon contamination in atomized powder. In fuel performance testing part, the thermal reaction swelling tests were carried out. The results showed that the atomized fuel meat swells 30 - 40 % lower than pulverized fuel meat. The corrosion test revealed that the thickness of oxide layer ranges within the criteria of fuel safe requirement. In the fuel design part, the design criteria have been established with evaluating KMRR fuel material characteristics with respect to KMRR operation. In the hydraulic testing part, the modification of test facility and the development of the measuring instrument and data aquisition system were performed. The preliminary testing results with dummy fuels fabricated by our research team showed that the developed system works normally and the results is almost same as AECL results. (Author).

7773 (KAERI/RR–1357/93) **Design, fabrication and installation of irradiation facilities -Advanced nuclear material development-.** Kim, Yong Seong (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Lee, Jeong Yeong; Lee, Seong Ho; Ji, Dae Yeong; Kim, Seok Hoon; An, Seong Ho; Kim, Dong Hoon; Seok, Ho Cheon; Kim, Joon Yeon; Yang, Seong Hong. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jul 1994. 275p. (In Korean). Order Number DE95612945. Source: OSTI; NTIS; INIS.

The objective of this study is to design and construct the steady state fuel test loop and non-instrumented capsules to be installed in KMRR. The principle contents of this project are to design, fabricate the steady-state fuel test loop and non-instrumented capsule to be installed in KMRR for nuclear technology development. This project will be completed in 1996, so preparation of design criteria for fuel test loop have been performed in 1993 as the first year of the first phase in implementing this project. Also design and pressure drop test of non-instrumented capsule have been performed in 1993.

7774 (KAERI/RR–1372/93) **Development of the radioisotope production facility for the KMRR -Studies on application of radiation and radioisotopes-.** Lee, Ji Bok (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Woo, Jong Seop; Kang, Kyeong Cheol; Baek, Sam Tae; Jeong, Un Soo; Jeon,

Yeong Keon; Cho, Seong Won; Kim, Joon Yeon. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jul 1994. 58p. (In Korean). Order Number DE95612946. Source: OSTI; NTIS; INIS.

It's been 30 years since to start RI and labelled compound production in this country. But it is so limited to certain nuclide due to small research reactor and its RI production facilities. In order to upgrade and expand RI, it is necessary to operate high neutron flux reactor and advanced RI production facilities. KMRR, power is 30 MW_{th} and maximum thermal neutron flux is 5 x 10^{14} n/cm^2sec, is under construction and it will be completed on the end of this year. Building and basic facility for RI production were included in KMRR project but hot cell and its equipment were not. It is urged to complete RI production facilities to produce RI for medical and industrial use. Design of RI production facility was done with KAERI's 30 years accumulated experiences and reference of many advanced country's facilities. Most of equipments and components for RI facility were made and installed by domestic suppliers except a few special items. Some part of RI production facility will be completed before KMRR operation, this means will contribute RI demend for the country and KMRR utilization. Basic civil structure for RI production such as building, concrete hot cells, source storage pool and basic utility system is part of the KMRR project. Basic equipment and components for 4 concrete hot cells, 17 lead hot cells and its equipment, purification system for Co-60 source storage pool, ventilation system, radiation monitoring system, and fire protection system are under this project. The followings were carried out during second year of the project period. Installation on the first year's manufacturing order: (1) Install overhead crane (2 tons) at inside of concrete hot cell (2) Manipulator performance test for lead hot cell (3) Radiation shielding window performance test for lead hot cell. Place manufacturing order for developed items: (1) Select qualified vendor and fabricate for led hot cell (2) Select qualified vendor and fabricate for HTS.

7775 (PINSTECH–131) **Delayed neutron monitoring system for fuel failure detection at PARR-1.** Ayazuddin, S.K. (Pakistan Inst. of Nuclear Science and Technology, Islamabad (Pakistan). Nuclear Engineering Div.); Ahmed, T.; Perez, S. Pakistan Inst. of Nuclear Science and Technology, Islamabad (Pakistan). Nuclear Engineering Div. Jul 1993. 16p. Order Number DE95615958. Source: OSTI; NTIS (US Sales Only); INIS.

8 fig.

Fuel failure detection is important from the point of view of the safety of nuclear reactors. After the conversion and upgradation of Pakistan Research Reactor-1 (PARR-1), it was desired to install a fuel failure detection system to confirm the performance and integrity of the new fuel elements. The fuel failure detection system is based on monitoring of delayed neutrons emitted from fission products leaking into the primary coolant loop from the fuel. For this purpose two neutron detectors (BF3) were placed in the graphite moderator blocks which were installed at the outlet coolant pipe in the valve pit. The graphite blocks were enclosed in lead shield and polyethylene to reduce background due to gamma and neutrons. (author). 8 fig.

7776 (PINSTECH–132) **Neutronic analysis for upgradation of Pakistan Research Reactor-1 from 9 to 10 MW.** Liaquat, L.A. (Pakistan Inst. of Nuclear Science and Technology, Islamabad (Pakistan). Nuclear Engineering Div.). Pakistan Inst. of Nuclear Science and Technology, Islamabad (Pakistan). Nuclear Engineering Div. Dec 1993. 23p. Order Number DE95615959. Source: OSTI; NTIS (US Sales Only); INIS.

In connection with upgradation of PARR-1 from 9 to 10 MW, the effects of enhanced power on various neutronic parameters have been investigated. These include: neutron energy spectrum, absolute and relative flux, control rod of worth and shutdown margin, fission product poisons, kinetic parameters, temperature coefficients of reactivity, fuel burnup and core excess reactivity. Results indicate that the reactor operation at 10 MW will improve neutron flux levels without compromising on reactor safety. (author).

7777 (PINSTECH–133) **Thermal hydraulic analysis for upgradation of Pakistan Research Reactor-1 from 9 to 10 MW.** Khan, L.A. (Pakistan Inst. of Nuclear Science and Technology, Islamabad (Pakistan). Nuclear Engineering Div.). Pakistan Inst. of Nuclear Science and Technology, Islamabad (Pakistan). Nuclear Engineering Div. Dec 1993. 17p. Order Number DE95615960. Source: OSTI; NTIS (US Sales Only); INIS.

Thermal hydraulic aspects of Pakistan Research Reactor-1 have been studied to upgrade its power level from 9 to 10 MW. Standard computer codes and correlations were used to compute: pressure drop and flow through different channels of the core, coolant critical velocity beyond which fuel plates may collapse, temperature distribution in the core, heat fluxes at onset of nucleate boiling, onset of flow instability and departure from nucleate boiling. Natural convection cooling at low power was also analyzed. Results indicate that the cores have reasonably high safety margins and reactor power can be upgraded to 10 MW without compromising on reactor safety. (author).

7778 (PINSTECH-HPD–143) **Sector emergency procedures for Pakistan Research Reactor-1 (PARR-1) PINSTECH.** Aziz, A. (Pakistan Inst. of Nuclear Science and Technology, Islamabad (Pakistan). Health Physics Div.); Aslam, M.; Faruq, M.U.; Ahmad, B.; Hasan, S.; Lodhi, N.P.K. Pakistan Inst. of Nuclear Science and Technology, Islamabad (Pakistan). Health Physics Div. Dec 1992. 44p. Order Number DE95615957. Source: OSTI; NTIS (US Sales Only); INIS.

A plan for handling of the radiation emergency situation prevailing outside PINSTECH has been incorporated in this report. This report outlines the detailed procedures and collective responsibilities and actions to be undertaken for meeting the emergency situation. These procedures include announcement/notification of emergency, evaluation of emergency, control of access and aggress, personnel monitoring and internal dosimetry, medical care of injured etc. A summary of the role and responsibilities of PINSTECH and the public organisations during a sector emergency at PINSTECH has been included as an appendix. (Orig./A.B.).

7779 (PINSTECH-NPD–136) **Contributions of research Reactors in science and technology.** Butt, N.M. (Pakistan Inst. of Nuclear Science and Technology, Islamabad (Pakistan). Nuclear Physics Div.); Bashir, J. Pakistan Inst. of Nuclear Science and Technology, Islamabad (Pakistan). Nuclear Physics Div. Dec 1992. 30p. Order Number DE95615650. Source: OSTI; NTIS (US Sales Only); INIS.

In the present paper, after defining a research reactor, its basic constituents, types of reactors, their distribution in the world, some typical examples of their uses are given. Particular emphasis in placed on the contribution of PARR-I (Pakistan Research Reactor-I), the 5 MW Swimming Pool Research reactor which first became critical at the Pakistan Institute of Nuclear Science and Technology (PINSTECH) in Dec. 1965 and attained its full power in June 1966. This is still the major research facility at PINSTECH for research and development. (author).

2209 Reactor Safety

Refer also to citation(s) 7470, 7649, 7650, 7652, 7705, 7707, 7765, 7882, 8637

7780 (BNL–60744) **Organizational factors and nuclear power plant safety.** Haber, S.B. Brookhaven National Lab., Upton, NY (United States). [1995]. 3p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-9410264–1: International conference on human factors research in nuclear power operation, Berlin (Germany), 31 Oct - 2 nov 1994). Order Number DE95004231. Source: OSTI; NTIS; INIS; GPO Dep.

There are many organizations in our society that depend on human performance to avoid incidents involving significant adverse consequences. As our culture and technology have become more sophisticated, the management of risk on a broad basis has become more and more critical. The safe operation of military facilities, chemical plants, airlines, and mass transit, to name a few, are substantially dependent on the performance of the organizations that operate those facilities. The nuclear power industry has, within the past 15 years, increased the attention given to the influence of human performance in the safe operation of nuclear power plants (NPP). While NPPs have been designed through engineering disciplines to intercept and mitigate events that could cause adverse

consequences, it has been clear from various safety-related incidents that human performance also plays a dominant role in preventing accidents. Initial efforts following the 1979 Three Mile Island incident focused primarily on ergonomic factors (e.g., the best design of control rooms for maximum performance). Greater attention was subsequently directed towards cognitive processes involved in the use of NPP decision support systems and decision making in general, personnel functions such as selection systems, and the influence of work scheduling and planning on employees' performance. Although each of these approaches has contributed to increasing the safety of NPPS, during the last few years, there has been a growing awareness that particular attention must be paid to how organizational processes affect NPP personnel performance, and thus, plant safety. The direct importance of organizational factors on safety performance in the NPP has been well-documented in the reports on the Three Mile Island and Chernobyl accidents as well as numerous other events, especially as evaluated by the U.S. Nuclear Regulatory Commission (NRC).

7781 (BNL-NUREG–61147) **Understanding earthquake design criteria used in Japan.** Hofmayer, C.H. (Brookhaven National Lab., Upton, NY (United States)); Park, Y.J.; Costello, J.F. Brookhaven National Lab., Upton, NY (United States). [1994]. 11p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-941227–4: 5. symposium on current issues related to nuclear power plant structure, equipment and piping, Orlando, FL (United States), 14-16 Dec 1994). Order Number DE95004837. Source: OSTI; NTIS; INIS; GPO Dep.

This paper summarizes the current earthquake design criteria used in Japan for nuclear power plants. Information is presented on the codes and standards and seismic requirements for reactor buildings and containment structures. The most interesting features of the earthquake design criteria used in Japan, in the light of those used in the United States, are summarized.

7782 (CONF-9411177–Absts., [pp. n]) **Nuclear power plant safety in the framework of future energy systems.** Kroeger, W. (Paul Scherrer Inst. (PSI), Villigen (Switzerland)). Paul Scherrer Inst. (PSI), Villigen (Switzerland). 1994. [36p.] From Energy days 94; Villigen (Switzerland); 10-11 Nov 1994. In *Programme and book of abstracts.* Order Number DE95743548. Source: OSTI; NTIS.

Short communication REACTOR SAFETY/research programs; SWITZERLAND/research programs; SWITZERLAND; AFTER-HEAT REMOVAL; PLUTONIUM RECYCLE

7783 (DOE/EH–95006312) **Manual of functions, assignments, and responsibilities for nuclear safety: Revision 2.** USDOE, Washington, DC (United States). 15 Oct 1994. 386p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95006312. Source: OSTI; NTIS; GPO Dep.

The FAR Manual is a convenient easy-to-use collection of the functions, assignments, and responsibilities (FARs) of DOE nuclear safety personnel. Current DOE directives, including Orders, Secretary of Energy Notices, and other assorted policy memoranda, are the source of this information and form the basis of the FAR Manual. Today, the majority of FARs for DOE personnel are contained in DOE's nuclear safety Orders. As these Orders are converted to rules in the Code of Federal Regulations, the FAR Manual will become the sole source for information relating to the functions, assignments, responsibilities of DOE nuclear safety personnel. The FAR Manual identifies DOE directives that relate to nuclear safety and the specific DOE personnel who are responsible for implementing them. The manual includes only FARs that have been extracted from active directives that have been approved in accordance with the procedures contained in DOE Order 1321.1B.

7784 (DTU-AEF-NT–11) **Potential risks of nuclear ships.** Oelgaard, P.L. Danmarks Tekniske Univ., Lyngby (Denmark). Afd. for Elektrofysik. Jul 1994. 22p. Order Number DE95612954. Source: OSTI; NTIS; INIS.

This report represents an attempt to evaluate the potential risks of nuclear ships. Firstly reasons are given why nuclear ship accidents will not lead to accidents of the magnitude of the Chernobyl accident. This is due to much lower content of radioactive material and to different reactor designs. Next a review is given of the types of accidents which have actually occurred. Of these the reactor accidents which may lead to serious consequences for the crew and the environment are considered further. These are reactivity accidents and loss of coolant accidents. In addition the long term risks of sunken nuclear ships and sea disposed reactor compartments etc. are also discussed. Based on available accident data an attempt is made to estimate the probability of serious nuclear ship accidents. (au).

7785 (HMI-B–516) **Radiological effects of an aircraft crash into the BER II research reactor. Comparison of effects for HEU and LEU fuels.** Axmann, A. (Hahn-Meitner-Institut Berlin GmbH (Germany). Zentralabteilung Reaktor); Boehnert, R.; Ehrhardt, J.; Hasemann, I.; Roedder, P. Hahn-Meitner-Institut Berlin GmbH (Germany). Zentralabteilung Reaktor; Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Neutronenphysik und Reaktortechnik; Roedder (Peter) Ingenieurberatung, Aachen (Germany). Mar 1994. 77p. (In German). Order Number DE95738773. Source: OSTI; NTIS (US Sales Only); INIS.

Within the framework of the approval procedure for conversion from high enriched uranium (HEU, ca. 90% U-235, UAl_4-Al) to low enriched uranium (LEU, ca. < 20% U-235, U_3Si_2-Al, dispersion fuel), a verification was made for the BER II, whether or not and in how far this would have any influence on the previously known potential risk of the research reactor in case of any involvement in the crash of a high-speed military aircraft. In addition to this, the influence of the UFOMOD (effective 1984) and the current COSYMA program systems on an estimate of accident consequences were investigated. For this purpose a LEU source term was determined for activity release in case of a drained, melting core (27.4 fuel rods as compared to 34.4 in a HEU core). Updated accident consequence assessments were also carried out for the former HEU source term. (HP)

7786 (IAEA-TECDOC–766, pp. 21-28) **Safety principles for plutonium facilities in France.** Mercier, J.P. (CEA Centre d'Etudes de Fontenay-aux-Roses, 92 (France). Inst. de Protection et de Surete Nucleaire). International Atomic Energy Agency, Vienna (Austria). Oct 1994. (CONF-9310405–: Technical committee meeting on safe handling, transport and storage of plutonium, Vienna (Austria), 18-21 Oct 1993). In *Safe handling, transport and storage of plutonium. Proceedings of a technical committee meeting held in Vienna, 18-21 October 1993.* 120p. Order Number DE95614900. Source: OSTI; NTIS (US Sales Only); INIS.

Safety problems specific to the use of plutonium arise as a result of the radiotoxicity of the majority of its isotopes and their fissile nature. Measures intended to ensure safety during normal operations are homogeneous with those now adopted in the fuel cycle and particularly in the reprocessing facilities: protection from ionizing radiation by the emplacement of special shields; special attention is paid to protection from neutrons, confinement of radioactive material by the implementation of several containment systems, each comprising one or more barriers, limitation of the production and activity of liquid effluent by decontaminating and recycling fissile material, limitation of the production of solid radioactive waste containing α emitters, limitation of their specific activity, use of appropriate packaging. As far as accident mitigation is concerned, the safety of the facilities is based on the 'defence-in-depth' concept: prevent the occurrence of events which might initiate incidents thorough the high quality of design, construction and control of processes, and to prevent accidents by limiting the probability of their occurring and the vulnerability of installations, as well as limiting consequences by remedial measures. In the case of facilities using plutonium and fissile materials, safety is particularly based on mitigating the risk of criticality. With regard to the other risks, it is essential to avoid initiating events which could lead to the dispersion of fissile material into the facilities and the environment.

7787 (INIS-mf–15079) **Drill core investigations from the TMI-2 pressure vessel. Final report.** Sturm, D.; Katerbau, K.H.; Maile, K.; Ruoff, H. Stuttgart Univ. (Germany). Staatliche Materialpruefungsanstalt. Jan 1994. 268p. (In German, English). Sponsored by Bundesministerium fuer Forschung und Technologie, Bonn (Germany). Foerderkennzeichen BMFT 1500833; Project Number MPA 871500000. Order Number DE95738688. Source: OSTI; NTIS (US Sales Only); INIS.

For the evaluation of the results obtained in TMI-2 VIP and for the preparation of the continuing discussion in the OECD and of research measures in the national sphere but also for the appraisal of the effect of the results to date on safety philosophy and safety research in Germany, the present research project, inter alia, was commenced. In content was: (a) Furtherance of the OECD-NEA-TMI-2 Vessel Investigation Project in dealing with the testing programme by active collaboration in the Programme Review Group, by participation in ad-hoc meetings on the question of specimen extraction, by advice on the conduct of metallographic, metallurgical and mechanical investigations on the specimens from the RPV bottom head and by assessment of the findings. (b) Investigation of specimens from the bottom head of the TMI-2 reactor pressure vessel. (c) Investigation of specimens from archive material. The investigations reach the widely agreed conclusion that during the accident a hot spot developed in the bottom head of the reactor in which for a time of about 30 minutes a maximum temperature of some 1100 C or greater than 900 C prevailed. Around this zone there is a region with temperatures higher than ca. 730 C (A_1) whilst the predominant portion of the head had not been heated beyond the $_1$ temperature. (orig.)

7788 (KFK–5326) **Papers presented as part of the status report of the Nuclear Safety Research Project of the Karlsruhe Nuclear Center on 23 March 1994.** Hueper, R. (comp.). Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Nukleare Sicherheitsforschung. May 1994. 284p. (In German). (CONF-9403194–: Status report of Projekt Nukleare Sicherheitsforschung (PSF) of Kernforschungszentrum Karlsruhe GmbH (KfK), Karlsruhe (Germany), 23 Mar 1994). Order Number DE95738354. Source: OSTI; NTIS (US Sales Only); INIS.

The ten papers deal with the state of safety requirements on future LWR plants and with nuclear safety research with regard to fast reactors and future PWR plants. In particular, passive after-heat removal, core disruptive accidents, and actinide burning in fast reactors are analysed. For PWR type plants the fuel element behaviour in the event of accidents, hydrogen distribution and hydrogen fires, and the origin and effects of steam explosions on the reactor pressure vessel and the containment are examined. Core meltdown cooling systems are suggested. (DG)

7789 (KFK–5326, pp. 1-14) **Safety requirements on future LWR plants.** Kessler, G. (INR, Kernforschungszentrum Karlsruhe (Germany)). Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Nukleare Sicherheitsforschung. May 1994. (In German). (CONF-9403194–: Status report of Projekt Nukleare Sicherheitsforschung (PSF) of Kernforschungszentrum Karlsruhe GmbH (KfK), Karlsruhe (Germany), 23 Mar 1994). In *Papers presented as part of the status report of the Nuclear Safety Research Project of the Karlsruhe Nuclear Center on 23 March 1994.* 284p. Order Number DE95738354. Source: OSTI; NTIS (US Sales Only); INIS.

If complied with, the listed safety requirements on future PWR type reactors will lead to a considerable increase in safety standards. Even in the event of core meltdown or core disruption within the containment, no drastic measures, such as evacuation, will have to be taken. Concepts of cooling the molten core and impeding its meltdown exist. Concepts of long-term after-heat removal - as shown in the case of the AP 600 - are technically feasible. (DG)

7790 (KFK–5326, pp. 15-32) **The R and D program of the Nuclear Safety Research Project.** Heusener, G. Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Nukleare Sicherheitsforschung. May 1994. (In German). (CONF-9403194–: Status report of Projekt Nukleare Sicherheitsforschung (PSF) of Kernforschungszentrum Karlsruhe GmbH (KfK), Karlsruhe (Germany), 23 Mar 1994). In *Papers presented as part of the status report of the Nuclear Safety Research Project of the Karlsruhe Nuclear Center on 23 March 1994.* 284p. Order Number DE95738354. Source: OSTI; NTIS (US Sales Only); INIS.

The paper deals with the tasks of the Nuclear Safety Research project run by Karlsruhe, Nuclear Research Center. After stopping work on the EFR in 1993, research concentrates on the key problems of safety of large PWR plants, in particular the EPR. Problems involved are outlined. (DG)

7791 (KFK–5326, pp. 33-73) **Studies of passive after-heat removal for fast reactors.** Hoffmann, H. (Institut fuer Angewandte Thermo- und Fluiddynamik, Kernforschungszentrum Karlsruhe (Germany)); Wilhelm, D.; Weinberg, D. Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Nukleare Sicherheitsforschung. May 1994. (In German). (CONF-9403194–: Status report of Projekt Nukleare Sicherheitsforschung (PSF) of Kernforschungszentrum Karlsruhe GmbH (KfK), Karlsruhe (Germany), 23 Mar 1994). In *Papers presented as part of the status report of the Nuclear Safety Research Project of the Karlsruhe Nuclear Center on 23 March 1994.* 284p. Order Number DE95738354. Source: OSTI; NTIS (US Sales Only); INIS.

The studies served to prove that the after-heat may be removed by natural convection without inadmissibly stressing the structures. To describe this thermohydraulic system behaviour, one- and multi-dimensional computer codes were used. The computer calculation codes were supported by experiments. Studies of natural convection in the primary system were performed by the RAMONA, NEPTUN and KIWA models. The FLUTAN computer calculation code was validated for laminar, buoyant flows. (orig./DG)

7792 (KFK–5326, pp. 74-114) **Analysis of core disruptive accidents in fast reactors.** Struwe, D. (Kernforschungszentrum Karlsruhe GmbH (KfK) (Germany). Inst. fuer Reaktorsicherheit (IRS)); Maschek, W. Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Nukleare Sicherheitsforschung. May 1994. (In German). (CONF-9403194–: Status report of Projekt Nukleare Sicherheitsforschung (PSF) of Kernforschungszentrum Karlsruhe GmbH (KfK), Karlsruhe (Germany), 23 Mar 1994). In *Papers presented as part of the status report of the Nuclear Safety Research Project of the Karlsruhe Nuclear Center on 23 March 1994.* 284p. Order Number DE95738354. Source: OSTI; NTIS (US Sales Only); INIS.

To determine the consequences of core disruptive accidents in metal cooled reactors, methods secured by experiments were made available which enable a realistic description, as far as possible, of the sequence of events. Regarding the first stage of a core disruptive accident, this can be done today with sufficient accuracy. As regards the later accident stages, such as the transition phase, the phase of large-scale material movements and mild discharge, and the expansion phase, insecurities naturally increase in view of a more extensive core disruption. In these areas of accident analysis an overall conservatively oriented approach is still required. Inspite of this, the influences of plant-specific design characteristics may securely be determined nowadays, and particulars can be given of the thermal and mechanical loads of the reactor vessel, its internals, and of the vessel closure head structures, as a consequence of core disruptive accidents. (orig./DG)

7793 (KFK–5326, pp. 132-166) **CORA results concerning LWR fuel element behaviour in the event of severe reactor accidents.** Hofmann, P. (Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Materialforschung); Schanz, G.; Hagen, S.; Noack, V.; Sepold, L. Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Nukleare Sicherheitsforschung. May 1994. (In German). (CONF-9403194–: Status report of Projekt Nukleare Sicherheitsforschung (PSF) of Kernforschungszentrum Karlsruhe GmbH (KfK), Karlsruhe (Germany), 23 Mar 1994). In *Papers presented as part of the status report of the Nuclear Safety Research Project of the Karlsruhe Nuclear Center on 23 March 1994.* 284p. Order Number DE95738354. Source: OSTI; NTIS (US Sales Only); INIS.

In the framework of the CORA program the chemical interactions among fuel element (core) materials that may occur with increasing temperature up to complete melting have been examined. The high-temperature material behavior of PWR, BWR, and VVER-1000 fuel rod bundles has been studied in large-scale integral experiments and extensive separate-effects tests. In many cases, the reaction products are liquid at temperatures above 1200 C or have lower eutectic melting points than their original components. (orig./DG)

7794 (KFK–5326, pp. 167-213) **Studies of distribution and combustion of hydrogen in PWR type plants.** Breitung, W. (Kernforschungszentrum Karlsruhe (Germany)); Redlinger, R.; Royl, P. Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Nukleare Sicherheitsforschung. May 1994. (In German).

(CONF-9403194–: Status report of Projekt Nukleare Sicherheitsforschung (PSF) of Kernforschungszentrum Karlsruhe GmbH (KfK), Karlsruhe (Germany), 23 Mar 1994). In *Papers presented as part of the status report of the Nuclear Safety Research Project of the Karlsruhe Nuclear Center on 23 March 1994.* 284p. Order Number DE95738354. Source: OSTI; NTIS (US Sales Only); INIS.

The project aims at determining possible loads on buldings due to hydrogen combustion in the event of severe, core disruptive accidents. The results obtained serve to further develop containment concepts and optimize possible hydrogen disintegration measures (e.g. igniters) for future light water reactors. Partial results have been achieved in the field of detonation ignition criteria with regard to ignition by means of a turbulent open jet, compression wave focussing, and flame acceleration. Reaction kinetics of complex accident atmospheres was studied in preliminary experiments and theoretically interpreted. (orig./DG)

7795 (KFK–5326, pp. 214-232) **Studies into steam explosion scenarios.** Jacobs, H. (INR, Kernforschungszentrum Karlsruhe (Germany)); Meyer, L.; Schuetz, W. Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Nukleare Sicherheitsforschung. May 1994. (In German). (CONF-9403194–: Status report of Projekt Nukleare Sicherheitsforschung (PSF) of Kernforschungszentrum Karlsruhe GmbH (KfK), Karlsruhe (Germany), 23 Mar 1994). In *Papers presented as part of the status report of the Nuclear Safety Research Project of the Karlsruhe Nuclear Center on 23 March 1994.* 284p. Order Number DE95738354. Source: OSTI; NTIS (US Sales Only); INIS.

If large amounts of core melt are mixed with water, a steam explosion may cause damage which, in an extreme case, may lead to early containment failure. At the Karlsruhe Nuclear Research Center, theoretical (calculation program IVA-KA) and experimental studies (QUEOS and PREMIX), tuned to each other, are prepared by which realistic, conservative upper limits for mechanical loads caused by steam explosions are to be determined. (orig.)

7796 (KFK–5326, pp. 233-248) **Loads affecting the reactor pressure vessel in the event of a steam explosion.** Krieg, R. (Institut fuer Reaktorsicherheit, Kernforschungszentrum Karlsruhe (Germany)); Schleisiek, K. Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Nukleare Sicherheitsforschung. May 1994. (In German). (CONF-9403194–: Status report of Projekt Nukleare Sicherheitsforschung (PSF) of Kernforschungszentrum Karlsruhe GmbH (KfK), Karlsruhe (Germany), 23 Mar 1994). In *Papers presented as part of the status report of the Nuclear Safety Research Project of the Karlsruhe Nuclear Center on 23 March 1994.* 284p. Order Number DE95738354. Source: OSTI; NTIS (US Sales Only); INIS.

It is assumed that by a strong in-vessel steam explosion up to 80 000 kg of core melt are thrown upwards against the still existing upper internals and the vessel closure head. That could cause a closure head fracture or rupture, and large parts could crash into the containment wall and damage it. Slug-impact experiments are intended to show that thereby way no inadmissible leakages are caused in the containment. (orig./DG)

7797 (KFK–5326, pp. 249-280) **Molten core cooling systems for future PWR plants.** Alsmeyer, H. (Kernforschungszentrum Karlsruhe (Germany)); Werle, H. Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Nukleare Sicherheitsforschung. May 1994. (In German). (CONF-9403194–: Status report of Projekt Nukleare Sicherheitsforschung (PSF) of Kernforschungszentrum Karlsruhe GmbH (KfK), Karlsruhe (Germany), 23 Mar 1994). In *Papers presented as part of the status report of the Nuclear Safety Research Project of the Karlsruhe Nuclear Center on 23 March 1994.* 284p. Order Number DE95738354. Source: OSTI; NTIS (US Sales Only); INIS.

The three concepts of cooling core melts outside the reactor pressure vessel which were studied by the KfK are designed to remove the after-heat through direct contact with water. To this effect, the melt surface is enlarged by geometrical distribution in such a way as to produce favourable conditions for heat removal from the poorly heat conducting melt which then starts to rapidly and completely consolidate. However, since in the case of direct contact of melt with water strong interactions in the form of limited steam explosions cannot be excluded, an important objective is the experimental determination of possibly caused mechanical loads. (orig.)

7798 (KFK–5327) **Safety-related LWR research. Annual report 1993.** Hueper, R. (comp.). Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Nukleare Sicherheitsforschung. Jun 1994. 251p. (In German, English). Order Number DE95738330. Source: OSTI; NTIS (US Sales Only); INIS.

The reactor safety R and D work of the Karlsruhe Nuclear Research Centre (KfK) has been part of the Nuclear Safety Research Project (PSF) since 1990. The present annual report 1993 summarizes the results on LWR safety. The research tasks are coordinated in agreement with internal and external working groups. The contributions to this report correspond to the status at the end of 1993. (orig./HP)

7799 (KFK–5327, pp. 1-45) **Studies of hydrogen distribution and combustion in PWR plants.** Breitung, W.; Redlinger, R.; Royl, P. Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Nukleare Sicherheitsforschung. Jun 1994. (In German). In *Safety-related LWR research. Annual report 1993.* 251p. Order Number DE95738330. Source: OSTI; NTIS (US Sales Only); INIS.

During the reporting period the emphasis of the research program on hydrogen combustion at KfK and its external partners was an investigation of pressure loads from fast hydrogen-air combustion processes, like accelerated flames and deflagration-to-detonation transitions. The important physical processes and load parameters are summarized and then two experimental series are described which were performed to broaden the data base for fast combustion-generated pressure loads towards more reactortypical severe accident conditions. (orig.)

7800 (KFK–5327, pp. 46-51) **Premix experiments.** Huber, F.; Peppler, W.; Will, H. Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Nukleare Sicherheitsforschung. Jun 1994. (In German). In *Safety-related LWR research. Annual report 1993.* 251p. Order Number DE95738330. Source: OSTI; NTIS (US Sales Only); INIS.

After a core meltdown due to an uncontrolled LOCA, liquid fuel can penetrate into the lower coolant plenum, presumably through the openings of the grid plate. The jets of core material might mingle with residual water, which would not exclude the possibility of a steam explosion. In such a case the mechanical energy release would depend on the quantities of premixed materials. This premixing is a precondition for a coherent thermal interaction. Statements about a possible failure of RPV or containment integrity require a detailed knowledge of those phenomena. KfK is therefore performing numerous experimental and theoretical studies of mixing phenomena. (orig.)

7801 (KFK–5327, pp. 52-61) **Mechanical loads on the RPV.** Goeller, B.; Hailfinger, G.; Hoffmann, G.; Jonatzke, O.; Krieg, R.; Malmberg, T.; Schleisiek, K.; Stratmanns, E. Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Nukleare Sicherheitsforschung. Jun 1994. In *Safety-related LWR research. Annual report 1993.* 251p. Order Number DE95738330. Source: OSTI; NTIS (US Sales Only); INIS.

Energy assessments have been discussed for a molten fuel slug impact on the upper pressure vessel structures. In order to obtain more definite results, also the momentum transfer has been considered from the molten fuel slug to the vessel head. It turns out that the interaction between the slug flow and the collapsing upper core structures play an important role. Estimates are presented for the slug resistance of the vessel head. Finally, the model experiments BERDA are described which are indispensable for a reliable solution of this problem. (orig.)

7802 (KFK–5327, pp. 62-70) **Steam explosion, premixing experiments with solid spheres.** Huber, R.; Kuhn, D.; Mensinger, E.; Meyer, L.; Rehme, K.; Schumacher, G.; Woerner, G. Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Nukleare Sicherheitsforschung. Jun 1994. (In German). In *Safety-related LWR research. Annual report 1993.* 251p. Order Number DE95738330. Source: OSTI; NTIS (US Sales Only); INIS.

Experiments are performed with solid spheres at high temperatures to establish a data base for the premixing phase of a steam

explosion, which will be used for code improvement and validation. The hot spheres ($T \leq 2600$ K) are dropped into saturated water at 1 bar pressure. The objective of the experiments is to obtain data on the cooling rate of the spheres, their distribution in the water, the amount of generated steam and its distribution with respect to the spheres. The spheres have a diameter of 4.2 mm and 4.8 mm, respectively, depending on the material used. Molybdenum coated with rhenium to inhibit oxidation, and ZrO_2 are used. The experimental parameters are the mass flow of the spheres, their density and their temperature. The experiments are performed at two test facilities. At a small test facility (Fig. 2) single spheres (diameter 10-20 mm) or up to 200 small spheres (diameter 4-5 mm) can be heated and cooled in 4 liters of saturated water. The planned QUEOS test facility (Fig. 1) will allow to heat 7000 cm^3 of spheres (about 100 000) and use 500 litres of water with a depth of 1 m. Some typical results from the experiments with a single sphere are presented here. Temperatures are measured with high temperature thermocouples and by pyrometers. Observation by high speed photography shows the vapor film around the sphere and thee periodic growing and detachment of the steam bubbles. The film taken at an experiment with 100 small spheres shows the individual spheres and their vapor wake. (orig.)

7803 (KFK–5327, pp. 71-79) **Theoretical analyses of interactions between core melt and coolant.** Arnecke, G.; Jacobs, H.; Stehle, B.; Thurnay, K.; Vaeth, L.; Lummer, M. Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Nukleare Sicherheitsforschung. Jun 1994. (In German). In *Safety-related LWR research. Annual report 1993.* 251p. Order Number DE95738330. Source: OSTI; NTIS (US Sales Only); INIS.

The code IVA3 will be utilized for analysing the physical processes related to steam explosions, i.e. the premixing phase preceeding the explosion and the explosion itself. The programme models the thermo- and fluiddynamics of multi-phase, three-component systems, esp. the movements of molten material, water and vapour with one velocity field for each of the three components. The following activities are reported on: 1. Modifications of the model and code corrections: An improved model for the heat transfer between the three components has been inserted and a number of code errors were corrected. 2. The programme was made more user-friendly concerning its input, its graphical output and the programme management. 3. A FARO-experiment (investigating the behaviour of molten material falling into water) was recalculated with IVA3 in order to test the new model. The initial pressure increase is very well reproduced by the code, whereas the results at later times indicate a too effective heat transfer and thus the need for some more model refinement. 4. The COMET-experiments planned at KfK are designed to simulate the behaviour of molten core material cooled from below with water. They were precalculated with an intermediate version of IVA3 (June 1993). Recently one of the calculations was repeated with the newest code version. The interaction of melt and water turned out to be much more benign in the new calculation. However, a numerical problem still prevents the calculation to proceed to large times. This problem is being analysed; a recalculation of all experiments will have to be performed after its solution. (orig.)

7804 (KFK–5327, pp. 80-89) **Mechanical loads on internal containment structures.** Jacobs, G. Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Nukleare Sicherheitsforschung. Jun 1994. (In German). In *Safety-related LWR research. Annual report 1993.* 251p. Order Number DE95738330. Source: OSTI; NTIS (US Sales Only); INIS.

A short account is given of current work to assess the loads of support structures of the RPV and the reactor pit, as a consequence of a hypothetical rupture of the RPV bottom at high pressure. (orig.)

7805 (KFK–5327, pp. 84-89) **Load capacity analysis of RPV failure.** Ritter, B.; Laemmer, H. Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Nukleare Sicherheitsforschung. Jun 1994. (In German). In *Safety-related LWR research. Annual report 1993.* 251p. Order Number DE95738330. Source: OSTI; NTIS (US Sales Only); INIS.

In case that accident management measures are not sufficient for heat rejection from the RPV, severe core failures and meltdown can result. The present report gives intermediate results of analyses concerning the load capacity and the effects of geometrical and thermal imperfections on deformation behavior of the RPV. (orig.)

7806 (KFK–5327, pp. 90-100) **Studies of core catcher concepts.** Fieg, G.; Moeschke, M.; Werle, H. Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Nukleare Sicherheitsforschung. Jun 1994. (In German). In *Safety-related LWR research. Annual report 1993.* 251p. Order Number DE95738330. Source: OSTI; NTIS (US Sales Only); INIS.

Underneath the RPV of future PWRs a space is to be provided for a core catcher capable of taking care of the whole core melt. As an alternative to an earlier concept providing for a spread of the core melt on a flat sacrifical bed, we investigate a staggered-pan concept in a particle bed, in which the melt can spread both vertically and horizontally. Such a spatial distribution would make for a better long-term coolability. (orig.)

7807 (KFK–5327, pp. 101-110) **The COMET concept.** Alsmeyer, H.; Tromm, W. Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Nukleare Sicherheitsforschung. Jun 1994. (In German). In *Safety-related LWR research. Annual report 1993.* 251p. Order Number DE95738330. Source: OSTI; NTIS (US Sales Only); INIS.

The COMET core catcher has been conceived to use the sump water resulting from an accident for cooling the core melt that has penetrated the RPV. In order to attain rapid cooling in spite of the low heat conductivity of a predominantly oxide core melt, the melt is first to be spread quickly, and subsequently to solidify due to water access from below and, connected with it, strong evaporation processes. The present report describes various experiments planned to test this concept. (orig.)

7808 (KFK–5327, pp. 111-115) **Technical boundary conditions for an accident filter.** Dillmann, H.G.; Pasler, H.; Heilig, E.; Schmitt, H. Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Nukleare Sicherheitsforschung. Jun 1994. (In German). In *Safety-related LWR research. Annual report 1993.* 251p. Order Number DE95738330. Source: OSTI; NTIS (US Sales Only); INIS.

A prototype filter combination of a HEPA and an iodine stage for low pressure drop has been tested. The results for the pressure drop and the efficiency are given. (orig.)

7809 (KFK–5327, pp. 116-123) **Thermo-hydraulic investigations on passive containment cooling.** Erbacher, F.J.; Just, W.; Neitzel, H.J.; Schmidt, H. Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Nukleare Sicherheitsforschung. Jun 1994. (In German). In *Safety-related LWR research. Annual report 1993.* 251p. Order Number DE95738330. Source: OSTI; NTIS (US Sales Only); INIS.

A containment for future pressurized water reactors should ensure that the decay heat can be removed in a passive way, e.g., by natural air convection. To investigate the coolability of the composite containment by natural air convection the PASCO test facility was set up. The test facility was completed and first experiments were performed. The PASCO computer code was evaluated to compare the test results with theoretical calculations. The first experiments gave a good agreement with the calculations. It was also shown that the radiation between the channel walls is very important and the emissivity is a very sensitive quantity. (orig.)

7810 (KFK–5327, pp. 124-145) **Containment concepts and load carrying capacity.** Dolensky, B.; Goeller, B.; Krieg, R. Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Nukleare Sicherheitsforschung. Jun 1994. In *Safety-related LWR research. Annual report 1993.* 251p. Order Number DE95738330. Source: OSTI; NTIS (US Sales Only); INIS.

For future pressurized water reactors a new containment design is under discussion, which shall be able to withstand severe accidents without significant radiological releases. One source for containment failure with large releases are missiles, as they might be created by a failure of the reactor pressure vessel under high pressure during a core melt accident. That is why appropriate protective measures against this accident scenario are under discussion today. In this paper a solution to this problem is discussed, proposing a new concept for a missile retention device. It provides

a gap of 0.5 m between reactor pressure vessel and any surrounding structure, thus allowing for the external access to the vessel as in the present plants. Additionally, the set-up forms a closed system with respect to the burst loads, so that no significant forces neither from the pressure vessel nor from the missile retention set-up itself are transmitted into the surrounding containment structures. A conservative assessment on the necessary dimensions shows that such a device is feasible with reasonable effort. (orig.)

7811 (KFK–5327, pp. 146-150) **Application of the CONTAIN code to LWRs.** Henneges, G.; Schmuck, P.; Scholtyssek, W. Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Nukleare Sicherheitsforschung. Jun 1994. (In German). In *Safety-related LWR research. Annual report 1993.* 251p. Order Number DE95738330. Source: OSTI; NTIS (US Sales Only); INIS.

An investigation was made of the dependence of the essential thermohydraulic parameters on the containment design, the operational data of the reactor, and on materials data. (orig.)

7812 (KFK–5327, pp. 151-183) **Experimental results of the CORA test program on the LWR fuel element behavior in severe reactor accidents.** Hofmann, P.; Schanz, G.; Hagen, S.; Noack, V.; Sepold, L.; Schumacher, G. Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Nukleare Sicherheitsforschung. Jun 1994. (In German). In *Safety-related LWR research. Annual report 1993.* 251p. Order Number DE95738330. Source: OSTI; NTIS (US Sales Only); INIS.

In the framework of the CORA program the chemical interactions among fuel element (core) materials that may occur with increasing temperature up to complete melting have been examined. The high-temperature material behavior of PWR, BWR, and VVER-1000 fuel rod bundles has been studied in large-scale integral experiments and extensive separate-effects tests. In many cases, the reaction products are liquid at temperatures above 1200 C or have lower eutectic melting points than their original components. This results in a relocation of liquefied components, often far below their original melting points. Control rod materials can separate from fuel materials by a non-coherent stage-by-stage relocation process; this may cause recriticality problems during flooding of a partially degraded core with unborated water. Similarly, molten unoxidized Zircaloy cladding can relocate away from the decladded UO_2 fuel rods. Significant relocation of UO_2 dissolved in molten unoxidized Zircaloy can begin at the Zircaloy melting temperature (1760 C), about 1000 K below the melting point of UO_2. Quenching (flooding) of the degraded bundles results in locally enhanced Zircaloy/steam reactions causing a renewed temperature rise, a meltdown of materials, and an additional strong H_2 generation. The experimental results have contributed substantially to the understanding of the high-temperature core material behavior in severe reactor accidents, and provided a unique data base for the development, improvement, and validation of material-behavior models and severe accident system codes. (orig.)

7813 (KFK–5327, pp. 184-208) **Post-test examination and evaluation of the CORA experiments. Contribution to the evaluation of the CORA-W1 test bundle.** Leistikow, S.; Schanz, G.; Metzger, H. Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Nukleare Sicherheitsforschung. Jun 1994. (In German). In *Safety-related LWR research. Annual report 1993.* 251p. Order Number DE95738330. Source: OSTI; NTIS (US Sales Only); INIS.

The CORA test program concerning the LWR behavior during severe accidents is performed by HIT under international agreement and is supported by IMF with separate materials studies and contributed evaluations. The experimental program has been completed with the test CORA-W1 and CORA-W2, bundles without and with absorber material, prepared in cooperation with the Kurchatov Institute, Moscow, in order to study VVER-1000 typical core materials and fuel element configuration. Reported are here the results of post-test microstructural investigations towards the complex interdependnce of the Zr-1% Nb cladding oxidation, the temperature escalation, the melting and the chemical interaction of components, the melt relocation and blockage formation. The results of this contribution are qualitatively comparable to the behavior of western LWR type fuels under SFD-conditions. A comprehensive report concerning the test data, the materials analyses, global relocation determination and hydrogen measurement is available, detailed evaluations are being performed by the Russian side. The results will also serve as a comparison basis for the CORA-W2 test, chosen as PECD code analysis standard problem (ISP-36). (orig.)

7814 (KFK–5327, pp. 209-211) **The FPT O experiment of the Phebus project.** Goetzmann, O. Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Nukleare Sicherheitsforschung. Jun 1994. (In German). In *Safety-related LWR research. Annual report 1993.* 251p. Order Number DE95738330. Source: OSTI; NTIS (US Sales Only); INIS.

The first of a series of six experiments of the Phebus fission product program was performed at CEN Cadarache on 2 Dec 1993. The present contribution gives a brief survey of observations and preliminary results of the test. (orig.)

7815 (KFK–5327, pp. 212-219) **Investigation of in-vessel accident sequences.** Sengpiel, W.; Homann, C.; Struwe, D. Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Nukleare Sicherheitsforschung. Jun 1994. (In German). In *Safety-related LWR research. Annual report 1993.* 251p. Order Number DE95738330. Source: OSTI; NTIS (US Sales Only); INIS.

The analyses of in-vessel accident sequences of LWRs aim at answering the following questions: - What is the mass of hydrogen released during a core degradation process with and without emergency cooling, respectively; - How is the material redistribution in the core up to the eventual formation of a melt pool; which failure modes of the crust of solidified core material are possible leading to the release of melt from the pool into the lower plenum; - What is the temperature history of the RPV wall during interaction with the core melt in the lower plenum. The SCDAP/RELAP5 computer code is used on a IBM RISC 6000. In a first step towards reactor case studies, out-of-pile experiments CORA-7 and CORA-13 have been calculated with SCDAP/RELAP5/ver7AG. The comparison with experimental results shows that transient fuel rod temperatures in the upper part of the CORA bundles generally agree rather well, whereas significant differences in the axial temperature profiles are found. Moreover, the calculation of CORA-13 indicated that the complex physical process of reflood can be calculated by SCDAP/RELAP5 without numerical difficulties. In parallel, preparations for the calculation of the core behavior of the EPR (European Pressurized Water Reactor) have been started in cooperation with Siemens/KWU). (orig.)

7816 (KFK–5327, pp. 220-234) **Modeling and assessment of accident consequences; development of RODOS, a real-time on-line decision support system for nuclear emergencies in Europe.** Benz, G.; Ehrhardt, J.; Faude, D.; Fischer, F.; Hasemann, I.; Meyer, D.; Paesler-Sauer, J.; Rafat, M.; Schichtel, T.; Schuele, O.; Steinhauer, C. Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Nukleare Sicherheitsforschung. Jun 1994. (In German). In *Safety-related LWR research. Annual report 1993.* 251p. Order Number DE95738330. Source: OSTI; NTIS (US Sales Only); INIS.

In cooperation with NRPB (UK), the first version 1.0 of PC COSYMA for use on advanced PCs has been released; during a training course in mid 1993, future users were educated in operating the software. The main frame version of the program package COSYMA has been up-dated with new dose conversion factors and fodd-chain data and was distributed to some 20 institutes in Europe and abroad. The comparative calculations performed within the international OECD(NEA)/CEC intercomparison of accident consequence assessment codes were analysed and documented in three reports. Furtheron, consequence assessments have been performed for the research reactor BER II (two source terms) and documented; the influence on individual doses and emergency actions of inplant accident management measures in future EPRs was quantified; within th scope of a EC/US-study on the external costs of the energy cycle, accident consequences were assessed for three source terms. (orig.)

7817 (LA–12866) **CONTAIN independent peer review.** Boyack, B.E. (Los Alamos National Lab., NM (United States)); Corradini, M.L.; Denning, R.S.; Khatib-Rahbar, M.; Loyalka, S.K.; Smith, P.N. Los Alamos National Lab., NM (United States). Jan

1995. 306p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). DOE Contract W-7405-ENG-36. Order Number DE95006356. Source: OSTI; NTIS; INIS; GPO Dep.

The CONTAIN code was developed by Sandia National Laboratories under the sponsorship of the US Nuclear Regulatory Commission (NRC) to provide integrated analyses of containment phenomena. It is used to predict nuclear reactor containment loads, radiological source terms, and associated physical phenomena for a range of accident conditions encompassing both design-basis and severe accidents. The code's targeted applications include support for containment-related experimental programs, light water and advanced light water reactor plant analysis, and analytical support for resolution of specific technical issues such as direct containment heating. The NRC decided that a broad technical review of the code should be performed by technical experts to determine its overall technical adequacy. For this purpose, a six-member CONTAIN Peer Review Committee was organized and a peer review as conducted. While the review was in progress, the NRC issued a draft "Revised Severe Accident Code Strategy" that incorporated revised design objectives and targeted applications for the CONTAIN code. The committee continued its effort to develop findings relative to the original NRC statement of design objectives and targeted applications. However, the revised CONTAIN design objectives and targeted applications. However, the revised CONTAIN design objectives and targeted applications were considered by the Committee in assigning priorities to the Committee's recommendations. The Committee determined some improvements are warranted and provided recommendations in five code-related areas: (1) documentation, (2) user guidance, (3) modeling capability, (4) code assessment, and (5) technical assessment.

7818 (NKS–94-7-REV) **Nordic nuclear safety research. Project plans for the 1994 - 1997 program.** Nordisk Kernesikkerhedsforskning, Roskilde (Denmark). Oct 1994. [209p.] (In Danish, Norwegian, English, Swedish). Order Number DE95616226. Source: OSTI; NTIS; INIS.

A new four-year Nordic nuclear research programme starts in 1994 as a follow-up of four previous programmes since 1977. The five Nordic countries have similar interests in maintaining competence in reactor safety and waste management, and are exposed to the same outside threats from reactors in neighbouring countries, nuclear powered vessels, and ensuing risk of contamination of terrestrial and aquatic areas. Joint Nordic project work appears an efficient means of promoting a unified view on safety issues, for regulatory authorities. It should also increase possibilities for individual countries to join the programmes of the European Union in fields related to nuclear safety. The programme is made up by seven projects, supplemented by coordination function. There are two projects in reactor safety, the first one on all the essential aspects that need to be taken into account in order to ascertain safety (project RAK-1), and the other one dealing with tools that are needed when examining the question of severe accidents (project RAK-2). In the field of waste management, methods are investigated (in project AFA-1) that permit to deal with low- and intermediate level waste containing long lived radionuclides. Consequences of radioactive contamination are dealt with in two radioecology projects: the role played by sediments, assuming contamination of the sea around the Nordic countries (project EKO-1), and the different time constants involved in the reduction of contamination in case of fall-out over various parts of the Nordic countries (project EKO-2). Two projects are in the area of emergency preparedness. One deals with measuring techniques that should yield the same results regardless of where and by which method they are performed (project EKO-3), the other involves testing whether corresponding professional knowledge exists in specific fields that are essential in the handling of an emergency situation (project EKO-4). (EG).

7819 (NUREG–1435-Suppl.4) **Status of safety issues at licensed power plants: TMI Action Plan requirements, unresolved safety issues, generic safety issues, other multiplant action issues. Supplement 4.** Nuclear Regulatory Commission, Washington, DC (United States). Office of Nuclear Reactor Regulation. Dec 1994. 156p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). Source: OSTI; NTIS; GPO; INIS.

As part of ongoing US Nuclear Regulatory Commission (NRC) efforts to ensure the quality and accountability of safety issue information, the NRC established a program for publishing an annual report on the status of licensee implementation and NRC verification of safety issues in major NRC requirements areas. This information was initially compiled and reported in three NUREG-series volumes. Volume 1, published in March 1991, addressed the status of Three Mile Island (TMI) Action Plan Requirements. Volume 2, published in May 1991, addressed the status of unresolved safety issues (USIs). Volume 3, published in June 1991, addressed the implementation and verification status of generic safety issues (GSIs). The first annual supplement, which combined these volumes into a single report and presented updated information as of September 30, 1991, was published in December 1991. The second annual supplement, which provided updated information as of September 30, 1992, was published in December 1992. Supplement 2 also provided the status of licensee implementation and NRC verification of other multiplant action (MPA) issues not related to TMI Action Plan requirements, USIs, or GSIs. Supplement 3 gives status as of September 30, 1993. This annual report, Supplement 4, presents updated information as of September 30, 1994. This report gives a comprehensive description of the implementation and verification status of TMI Action Plan requirements, safety issues designated as USIs, GSIs, and other MPAs that have been resolved and involve implementation of an action or actions by licensees. This report makes the information available to other interested parties, including the public. Additionally, this report serves as a follow-on to NUREG-0933, "A Prioritization of Generic Safety Issues," which tracks safety issues until requirements are approved for imposition at licensed plants or until the NRC issues a request for action by licensees.

7820 (NUREG/CR–6134) **Uncertainty and sensitivity analysis of chronic exposure results with the MACCS reactor accident consequence model.** Helton, J.C. (Arizona State Univ., Tempe, AZ (United States)); Johnson, J.D.; Rollstin, J.A.; Shiver, A.W.; Sprung, J.L. Nuclear Regulatory Commission, Washington, DC (United States). Office of Nuclear Regulatory Research. Jan 1995. 90p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). DOE Contract AC04-94AL85000. (SAND–93-2370). Source: OSTI; NTIS (documentation only); ESTSC (complete software package), P.O. Box 1020, Oak Ridge, TN 37831-1020 (United States); GPO; INIS.

Uncertainty and sensitivity analysis techniques based on Latin hypercube sampling, partial correlation analysis and stepwise regression analysis are used in an investigation with the MACCS model of the chronic exposure pathways associated with a severe accident at a nuclear power station. The primary purpose of this study is to provide guidance on the variables to be considered in future review work to reduce the uncertainty in the important variables used in the calculation of reactor accident consequences. The effects of 75 imprecisely known input variables on the following reactor accident consequences are studied: crop growing season dose, crop long-term dose, water ingestion dose, milk growing season dose, long-term groundshine dose, long-term inhalation dose, total food pathways dose, total ingestion pathways dose, total long-term pathways dose, total latent cancer fatalities, area-dependent cost, crop disposal cost, milk disposal cost, population-dependent cost, total economic cost, condemnation area, condemnation population, crop disposal area and milk disposal area. When the predicted variables are considered collectively, the following input variables were found to be the dominant contributors to uncertainty: dry deposition velocity, transfer of cesium from animal feed to milk, transfer of cesium from animal feed to meat, ground concentration of Cs-134 at which the disposal of milk products will be initiated, transfer of Sr-90 from soil to legumes, maximum allowable ground concentration of Sr-90 for production of crops, fraction of cesium entering surface water that is consumed in drinking water, groundshine shielding factor, scale factor defining resuspension, dose reduction associated with decontamination, and ground concentration of 1-131 at which disposal of crops will be initiated due to accidents that occur during the growing season.

7821 (NUREG/CR–6135) **Uncertainty and sensitivity analysis of early exposure results with the MACCS Reactor Accident Consequence Model.** Helton, J.C. (Arizona State Univ., Tempe, AZ (United States)); Johnson, J.D.; McKay, M.D.; Shiver, A.W.; Sprung, J.L. Nuclear Regulatory Commission, Washington, DC (United States). Office of Nuclear Regulatory Research. Jan 1995. 135p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). DOE Contract AC04-94AL85000. (SAND–93-2371). Source: OSTI; NTIS (documentation only); ESTSC (complete software package), P.O. Box 1020, Oak Ridge, TN 37831-1020 (United States); GPO; INIS.

Uncertainty and sensitivity analysis techniques based on Latin hypercube sampling, partial correlation analysis and stepwise regression analysis are used in an investigation with the MACCS model of the early health effects associated with a severe accident at a nuclear power station. The primary purpose of this study is to provide guidance on the variables to be considered in future review work to reduce the uncertainty in the important variables used in the calculation of reactor accident consequences. The effects of 34 imprecisely known input variables on the following reactor accident consequences are studied: number of early fatalities, number of cases of prodromal vomiting, population dose within 10 mi of the reactor, population dose within 1000 mi of the reactor, individual early fatality probability within 1 mi of the reactor, and maximum early fatality distance. When the predicted variables are considered collectively, the following input variables were found to be the dominant contributors to uncertainty: scaling factor for horizontal dispersion, dry deposition velocity, inhalation protection factor for nonevacuees, groundshine shielding factor for nonevacuees, early fatality hazard function alpha value for bone marrow exposure, and scaling factor for vertical dispersion.

7822 **Apparatus for unloading pressurized fluid.** Rehberger, K.M. 1992. Filed date 28 Oct 1992. U.S. Patent Application 7-967,482. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE95006135. Source: OSTI; NTIS (US Sales Only); GPO Dep.

This invention is comprised of an apparatus for unloading fluid, preferably pressurized gas, from containers in a controlled manner that protects the immediate area from exposure to the container contents. The device consists of an unloading housing, which is enclosed within at least one protective structure, for receiving the dispensed contents of the steel container, and a laser light source, located external to the protective structure, for opening the steel container instantaneously. The neck or stem of the fluid container is placed within the sealed interior environment of the unloading housing. The laser light passes through both the protective structure and the unloading housing to instantaneously pierce a small hole within the stem of the container. Both the protective structure and the unloading housing are specially designed to allow laser light passage without compromising the light's energy level. Also, the unloading housing allows controlled flow of the gas once it has been dispensed from the container. The external light source permits remote operation of the unloading device.

7823 (SAND–94-2709C) **Human event observations in the individual plant examinations.** Forester, J. Sandia National Labs., Albuquerque, NM (United States). [1995]. 20p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). DOE Contract AC04-94AL85000. (CONF-9410216–1: 22. transactions of the water reactor safety information meeting, Bethesda, MD (United States), 24-26 Oct 1994). Order Number DE95004542. Source: OSTI; NTIS; INIS; GPO Dep.

A major objective of the Nuclear Regulatory Commission's (NRC) Individual Plant Examination (IPE) Insights Program is to identify the important determinants of core damage frequency (CDF) for the different reactor and containment types and plant designs as indicated in the IPEs. The human reliability analysis (HRA) is a critical component of the probabilistic risk assessments (PRAS) which were done for the IPES. The determination and selection of human actions for incorporation into the event and fault tree models and the quantification of their failure probabilities can have an important impact on the resulting estimates of CDF and risk. Therefore, two important goals of the NRCs IPE Insights Program are (1) to determine the extent to which human actions and their corresponding failure probabilities influenced the results of the IPEs and (2) to identify which factors played significant roles in determining the differences and similarities in the results of the HRA analyses across the different plants. To obtain the relevant information, the NRC's IPE database, which contains information on plant design, CDF, and containment performance obtained from the IPES, was used in conjunction with a systematic examination of the HRA analyses and results from the IPES. Regarding the extent to which the results of the HRA analyses were significant contributors to the plants' CDFs, examinations of several different measures indicated that while individual human actions could have important influences on CDF for particular initiators, the HRA results did not appear to be the most significant driver of plant risk (CDF). Another finding was that while there were relatively wide variations in the calculated human error probabilities (HEPs) for similar events across plants, there was no evidence for any systematic variation as a function of the HRA methods used in the analyses.

24 POWER TRANSMISSION AND DISTRIBUTION

2403 Power Transmission Lines and Cables

7824 (DOE/EA–0962) **Final joint environmental assessment for the construction and routine operation of a 12-kilovolt (KV) overhead powerline right-of-way, and formal authorization for a 10-inch and 8-inch fresh water pipeline right-of-way, Naval Petroleum Reserve No. 1, Kern County, California.** USDOE Naval Petroleum Reserves in California, Tupman, CA (United States). Oct 1994. 132p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95002676. Source: OSTI; NTIS; GPO Dep.

The purpose and need of the proposed action, which is the installation of an overhead powerline extension from an Naval Petroleum Reserve No. 1 (NPR-1) power source to the WKWD Station A, is to significantly reduce NPR-1's overall utility costs. While the proposed action is independently justified on its own merits and is not tied to the proposed NPR-1 Cogeneration Facility, the proposed action would enable DOE to tie the NPR-1 fresh water pumps at Station A into the existing NPR-1 electrical distribution system. With the completion of the cogeneration facility in late 1994 or early 1995, the proposed action would save additional utility costs. This report deals with the environmental impacts of the construction of the powerline and the water pipeline. In addition, information is given about property rights and attaining permission to cross the property of proposed affected owners.

2405 Environmental Aspects

Refer also to citation(s) 7824

2407 Economic, Industrial, and Business Aspects

Refer also to citation(s) 7908

25 ENERGY STORAGE

7825 (CONF-9411177–Absts., [pp. n]) **The energy storage program of PSI.** Wokaun, A. (Paul Scherrer Inst. (PSI), Villigen (Switzerland)). Paul Scherrer Inst. (PSI), Villigen (Switzerland). 1994. [36p.] From Energy days 94; Villigen (Switzerland); 10-11 Nov 1994. In *Programme and book of abstracts.* Order Number DE95743548. Source: OSTI; NTIS.

Short communication ENERGY STORAGE/research programs; SWITZERLAND/research programs; SWITZERLAND; HYDROGEN; METHANOL; FUEL CELLS; ELECTRIC BATTERIES; NUMERICAL DATA

2501 Magnetic

7826 (ANL/ET/CP–82120) **Design of a high-temperature superconductor current lead for electric utility SMES.** Niemann, R.C. (Argonne National Lab., IL (United States)); Cha, Y.S.; Hull, J.R.; Rey, C.M.; Dixon, K.D. Argonne National Lab., IL (United States). [1995]. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-941013–18: Applied superconductivity conference, Boston, MA (United States), 16-21 Oct 1994). Order Number DE95004604. Source: OSTI; NTIS; INIS; GPO Dep.

Current leads that rely on high-temperature superconductors (HTSs) to deliver power to devices operating at liquid helium temperature have the potential to reduce refrigeration requirements to levels significantly below those achievable with conventional leads. The design of HTS current leads suitable for use in near-term superconducting magnetic energy storage (SMES) is in progress. The SMES system has an 0.5 MWh energy capacity and a discharge power of 30 MW. Lead-design considerations include safety and reliability, electrical and thermal performance, structural integrity, manufacturability, and cost. Available details of the design, including materials, configuration, and performance predictions, are presented.

7827 (TTKK/TST–2/94) **Availability analysis of a 100 kWh superconducting magnetic energy storage.** Maekinen, H.; Mikkonen, R. Tampere Univ. of Technology (Finland). Lab. of Electricity and Magnetism. 1994. 87p. Order Number DE95737621. Source: OSTI; NTIS.

Superconducting Magnetic Energy Storage (SMES) is one of the possible and useful applications of the modern superconducting technology. It is known that some loads on electricity distribution networks are particularly sensitive to short power interruptions and voltage sags. Different ranges of SMES applications have been widely discussed for large scale units (1 MWh - 1 GWh) as well as for small and medium scale units (1 kWh - 1 MWh). The major components of a SMES system are the superconducting magnet winding, the cryogenic refrigeration system and the power conditioning system, which interfaces the coil to the utility grid and applied load. The SMES winding is cooled by a cryogenic coolant: liquid helium for LTS (low temperature superconductor) wires; gaseous helium, liquid hydrogen or liquid nitrogen for HTS (high temperature superconductor) wires. In addition the higher operating temperature of HTS materials means also higher refrigeration efficiencies, greater realibility and easier acceptance within the utility community. It has been estimated that applying HTS materials in a SMES system will reduce the capital costs some 14-26 %. In this calculation it has been assumed that the price of HTS material is equivivalent to that of LTS material. This report deals with the availability aspects of a 100 kWh SMES. A conceptual design of a reference unit has been used as a basis of the study. Therefore the lack of the detailed design leads to uncertainty in evaluating the failure data for single components. The failure rate data are mainly adopted from fusion data sources. This extrapolation is problematic but in most cases the only way to get results at all. The method used is based on the failure modes, effects and criticality analysis, FMECA. Fault trees describe the outage logic based on the functional analysis. Event trees clarify the consequences of the primary events and the criticality of these consequences are expressed as system down times.

2506 Thermal

Refer also to citation(s) 7604

2509 Batteries

7828 (ANL/CMT/CP–82874) **Lithiated oxides for lithium-ion batteries.** Thackeray, M.M. Argonne National Lab., IL (United States). [1995]. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-941063–1: 186. meeting of the Electrochemical Society, Miami, FL (United States), 9-14 Oct 1994). Order Number DE95004645. Source: OSTI; NTIS; GPO Dep.

Rechargeable lithium batteries that can be assembled in the discharged state with lithiated metal oxide cathodes and carbon anodes are being developed to minimize the safety hazards associated with batteries that use pure metallic lithium anodes. This paper highlights the progress that has been made to develop lithiated transition metal oxide cathodes that have a layered structure, Li_xMoO_2, and those that have a spinel-type structure, $Li_xM_2O_4$, (M = Co, Ni, Mn, V). Emphasis is placed on the structural properties of insertion electrodes that control their stability during electrochemical cycling. The use of lithiated spinel oxide instead of lithiated carbon (LiC_6) as the anode is briefly discussed.

7829 (ANL/CMT/CP–83329) **Transition metal oxides for rocking-chair cells.** Thackeray, M.M. (Argonne National Lab., IL (United States). Electrochemical Technology Program); Ferg, E.; Gummow, R.J.; Kock, A. de. Argonne National Lab., IL (United States). [1994]. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-941144–21: 1994 fall meeting of the Materials Research Society (MRS), Boston, MA (United States), 28 Nov - 2 dec 1994). Order Number DE95004632. Source: OSTI; NTIS (US Sales Only); GPO Dep.

Transition metal oxides have been evaluated extensively in the past as cathode materials for lithium cells. The major emphasis of recent research has been to develop lithium-ion or rocking-chair cells that are assembled in the discharged state with a lithiated transition metal oxide cathode and a carbon anode. Although these cells are significantly safer to use than lithium cells with metallic lithium anodes, the possibility of depositing lithium at the surface of the carbon particles at the top of charge or at high rates of charge cannot be discounted. This paper discusses some recent developments in fabricating rocking-chair cells with transition metal oxide host structures as both anode and cathode, the anode providing a relatively low voltage vs. lithium and the cathode a relatively high voltage vs. lithium. These cells avoid the reducing and oxidation of lithium during charge and discharge and, therefore, reduce the safety hazards of lithium cells. Improved safety is gained, however, at the expense of cell voltage and specific energy.

7830 (KE–93011B) **Basic study on high performance secondary battery for electric load-leveling & electric vehicle.** Yang, J.H. (Korea Institute of Energy Research, Taejon (Korea, Republic of)); Seong, J.S.; Kim, J.D.; Ahn, Y.S.; Kim, H.S.; Han, S.O.; Kim, Y.N.; Kwan, K.K. No corporate text available. Dec 1993. 166p. (In Korean). Order Number DE95744288. Source: OSTI; NTIS (US Sales Only).

Na/S battery can have the higher energy density and higher power density than that of existing high performance secondary battery. This battery is expected to use for electric load leveling and electric vehicle. Ni/MH battery was developed in advanced countries, but it is one of the advanced technologies which are preserved in their own country. In the study on Na/S battery, properties of B^-alumina electrolyte was investigated. Also the construction technologies of this test cell was established by combining tube type of B^-alumina solid electrolyte with Na-, S-electrode etc. Especially of this cell, charge/discharge performance and open circuit voltage was examined. Mi/MH battery sample were tested with SBT500 system for self-discharge rate at room temp, was measured. It was found that the electrolyte and separator can be optimized to minimize the self-discharge rate. (author). refs., figs., tabs.

7831 (LBL–36293) **Thermal modeling of the lithium/polymer battery.** Pals, C.R. (Univ. of California, Berkeley, CA (United States). Dept. of Chemical Engineering). Lawrence Berkeley Lab., CA (United States). Oct 1994. 144p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00098. Order Number DE95004680. Source: OSTI; NTIS; GPO Dep.

Research in the area of advanced batteries for electric-vehicle applications has increased steadily since the 1990 zero-emission-vehicle mandate of the California Air Resources Board. Due to their design flexibility and potentially high energy and power densities, lithium/polymer batteries are an emerging technology for electric-vehicle applications. Thermal modeling of lithium/polymer batteries is particularly important because the transport properties of the system depend exponentially on temperature. Two models

have been presented for assessment of the thermal behavior of lithium/polymer batteries. The one-cell model predicts the cell potential, the concentration profiles, and the heat-generation rate during discharge. The cell-stack model predicts temperature profiles and heat transfer limitations of the battery. Due to the variation of ionic conductivity and salt diffusion coefficient with temperature, the performance of the lithium/polymer battery is greatly affected by temperature. Because of this variation, it is important to optimize the cell operating temperature and design a thermal management system for the battery. Since the thermal conductivity of the polymer electrolyte is very low, heat is not easily conducted in the direction perpendicular to cell layers. Temperature profiles in the cells are not as significant as expected because heat-generation rates in warmer areas of the cell stack are lower than heat-generation rates in cooler areas of the stack. This nonuniform heat-generation rate flattens the temperature profile. Temperature profiles as calculated by this model are not as steep as those calculated by previous models that assume a uniform heat-generation rate.

7832 **Electrochemical supercapacitors.** Rudge, A.J.; Ferraris, J.P.; Gottesfeld, S. 1992. Filed date 25 Nov 1992. U.S. Patent Application 7-981,450. 25p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. Order Number DE95006123. Source: OSTI; NTIS (US Sales Only); GPO Dep.

This invention pertains to a new class of electrochemical capacitors which provides in its charge state a positive electrode including an active material of a p-doped material and a negative electrode including an active material of an n-doped conducting polymer, where the p-doped and n-doped materials are separated by an electrolyte. In a preferred embodiment, the positive and negative electrode active materials are selected from conducting polymers consisting of polythiophene, polymers having an aryl group attached in the 3-position, polymers having aryl and alkyl groups independently attached in the 3- and 4-positions, and polymers synthesized from bridged dimers having polythiophene as the backbone. A preferred electrolyte is a tetraalykyl ammonium salt, such as tetramethylammonium trifluoromethane sulphonate (TMATFMS), that provides small ions that are mobile through the active material, is soluble in acetonitrile, and can be used in a variety of capacitor configurations.

7833 (SAND–94-2763C) **Recent advances in lithium ion technology.** Levy, S.C. Sandia National Labs., Albuquerque, NM (United States). [1995]. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. (CONF-950259–1: Portable by design conference, Santa Clara, CA (United States), 15-17 Feb 1995). Order Number DE95004769. Source: OSTI; NTIS; GPO Dep.

Lithium ion technology is based on the use of lithium intercalating electrodes. Carbon is the most commonly used anode material, while the cathode materials of choice have been layered lithium metal chalcogenides ($LiMX_2$) and lithium spinel-type compounds. Electrolytes may be either organic liquids or polymers. Although the first practical use of graphite intercalation compounds as battery anodes was reported in 1981 for molten salt cells (1) and in 1983 for ambient temperature systems (2) it was not until Sony Energytech announced a new lithium ion rechargeable cell containing a lithium ion intercalating carbon anode in 1990, that interest peaked. The reason for this heightened interest is that these cells have the high energy density, high voltage and fight weight of metallic lithium systems plus a very long cycle life, but without the disadvantages of dendrite formation on charge and the safety considerations associated with metallic lithium.

29 ENERGY PLANNING AND POLICY

7834 (CONF-9411177–Absts.) **Programme and book of abstracts.** Paul Scherrer Inst. (PSI), Villigen (Switzerland). 1994. 36p. (In English, German, French). From Energy days 94; Villigen (Switzerland); 10-11 Nov 1994. Order Number DE95743548. Source: OSTI; NTIS.

This publication contains 15 abstracts of papers presented at the PSI conference "Energietage 94".

7835 (CONF-9411177–Absts., [pp. n]) **Energy and sustainability: a global view.** Goldemberg, J. (Sao Paulo Univ., SP (Brazil)). Paul Scherrer Inst. (PSI), Villigen (Switzerland). 1994. [36p.] From Energy days 94; Villigen (Switzerland); 10-11 Nov 1994. In *Programme and book of abstracts.* Order Number DE95743548. Source: OSTI; NTIS.

Short communication ENERGY POLICY; CARBON DIOXIDE/taxes; GREENHOUSE EFFECT; TAXES

7836 (CONF-9411177–Absts., [pp. n]) **Politics and public policy: critical factors for sustainability in the energy sector.** Choucri, N. (Massachusetts Inst. of Tech., Cambridge, MA (United States)). Paul Scherrer Inst. (PSI), Villigen (Switzerland). 1994. [36p.] From Energy days 94; Villigen (Switzerland); 10-11 Nov 1994. In *Programme and book of abstracts.* Order Number DE95743548. Source: OSTI; NTIS.

Short communication ENERGY POLICY; SOCIO-ECONOMIC FACTORS; INDUSTRY

7837 (CONF-9411177–Absts., [pp. n]) **Sustainability as seen by the entrepreneur.** Fahrni, F. (Sulzer Bros. Ltd., Winterthur (Switzerland)). Paul Scherrer Inst. (PSI), Villigen (Switzerland). 1994. [36p.] From Energy days 94; Villigen (Switzerland); 10-11 Nov 1994. In *Programme and book of abstracts.* Order Number DE95743548. Source: OSTI; NTIS.

Short communication ENERGY POLICY; INDUSTRY

7838 (CONF-9411177–Absts., [pp. n]) **Sustainability: ecology comes of age.** Roch, P. (Federal Office of Environment, Forests and Landscape, Bern (Switzerland)). Paul Scherrer Inst. (PSI), Villigen (Switzerland). 1994. [36p.] From Energy days 94; Villigen (Switzerland); 10-11 Nov 1994. In *Programme and book of abstracts.* Order Number DE95743548. Source: OSTI; NTIS.

Short communication SWITZERLAND/energy policy; VOLATILE MATTER/hydrocarbons; SWITZERLAND; AIR POLLUTION; NITROGEN OXIDES; SULFUR DIOXIDE; HYDROCARBONS; INTERNATIONAL COOPERATION; SOCIO-ECONOMIC FACTORS; ECOLOGY; ECONOMY

7839 (CONF-9411177–Absts., [pp. n]) **World energy scenarios: the two-kilowatt-society, a plausible future or an illusion.** Winter, C.J. (Deutsche Forschungsanstalt fuer Luft- und Raumfahrt e.V. (DLR), Stuttgart (Germany)); Kesselring, P. Paul Scherrer Inst. (PSI), Villigen (Switzerland). 1994. [36p.] From Energy days 94; Villigen (Switzerland); 10-11 Nov 1994. In *Programme and book of abstracts.* Order Number DE95743548. Source: OSTI; NTIS.

Short communication EARTH PLANET/energy consumption; GREENHOUSE EFFECT; EUROPE; DEVELOPING COUNTRIES; DEVELOPED COUNTRIES; FINANCIAL DATA

7840 (CONF-9411177–Absts., [pp. n]) **Energy research in the European Union.** Allgeier, H.J. (Commission of the European Communities, Brussels (Belgium)). Paul Scherrer Inst. (PSI), Villigen (Switzerland). 1994. [36p.] From Energy days 94; Villigen (Switzerland); 10-11 Nov 1994. In *Programme and book of abstracts.* Order Number DE95743548. Source: OSTI; NTIS.

Short communication EUROPEAN UNION/energy policy; ENERGY POLICY/research programs; FOSSIL FUELS; RENEWABLE ENERGY SOURCES; FINANCIAL DATA

7841 (CONF-9411177–Absts., [pp. n]) **Energy research - as seen by industry.** Meyer, A. (ABB Power Generation Ltd., Baden (Switzerland)). Paul Scherrer Inst. (PSI), Villigen (Switzerland). 1994. [36p.] From Energy days 94; Villigen (Switzerland); 10-11 Nov 1994. In *Programme and book of abstracts.* Order Number DE95743548. Source: OSTI; NTIS.

Short communication INDUSTRY/research programs; NITROGEN OXIDES/air pollution abatement; COAL/fluidized-bed combustors; INDUSTRY; ENERGY CONSERVATION; FOSSIL FUELS; COAL; COGENERATION

2902 Economics and Sociology

Refer also to citation(s) 7682, 7849, 7860, 7874, 7881, 8009, 8010

7842 (CONF-9411177–Absts., [pp. n]) **Theory and practice of internalisation of external costs.** Bonus, H. (Muenster Univ.,

Inst. fuer Genossenschaftswesen, Muenster (Germany)). Paul Scherrer Inst. (PSI), Villigen (Switzerland). 1994. [36p.] (In German). From Energy days 94; Villigen (Switzerland); 10-11 Nov 1994. In *Programme and book of abstracts.* Order Number DE95743548. Source: OSTI; NTIS.

Short communication ENVIRONMENTAL POLICY/cost; CARBON DIOXIDE/taxes; COST; ECONOMICS; TAXES; DEVELOPING COUNTRIES

7843 (CONF-9411177–Absts., [pp. n]) **Internalisation of external costs in Switzerland and Europe.** Mauch, U. (Infras, Zurich (Switzerland)). Paul Scherrer Inst. (PSI), Villigen (Switzerland). 1994. [36p.] From Energy days 94; Villigen (Switzerland); 10-11 Nov 1994. In *Programme and book of abstracts.* Order Number DE95743548. Source: OSTI; NTIS.

Short communication SWITZERLAND/environmental policy; EUROPE/environmental policy; CARBON DIOXIDE/taxes; SWITZERLAND; EUROPE; TAXES

7844 (CONF-9411177–Absts., [pp. n]) **Methods for the integral assessment of energy-related problems.** Suter, P. (Eidgenoessische Technische Hochschule, Zurich (Switzerland)); Hirschberg, S. Paul Scherrer Inst. (PSI), Villigen (Switzerland). 1994. [36p.] From Energy days 94; Villigen (Switzerland); 10-11 Nov 1994. In *Programme and book of abstracts.* Order Number DE95743548. Source: OSTI; NTIS.

Short communication ENERGY SYSTEMS/environmental impacts; ENERGY SYSTEMS/risk assessment; SOCIO-ECONOMIC FACTORS; PHOTOVOLTAIC POWER SUPPLIES; SWITZERLAND

7845 (DOE/CE/90043–T1) **Continuation application, progress report, year IV, June 8, 1993–June 7, 1994.** American Chemical Society, Washington, DC (United States). 11 Mar 1994. 43p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG01-90CE90043. Order Number DE95004705. Source: OSTI; NTIS; GPO Dep.

Project SEED is an innovative career development program sponsored by the American Chemical Society for economically disadvantages high school students. SEED students spend ten weeks during the summer in an academic, industrial, or governmental research laboratory working under the supervision of a researcher or research assistant. The primary objective of Project SEED is to encourage participants to pursue strong academic programs in order to more fully develop their career potential and help overcome social, institutional, attitudinal, and educational obstacles which have traditionally excluded the economically disadvantaged. This summer the University of New Mexico at Los Alamos initiated a special course for Project SEED students. The weekly sessions focused on academic skills training in anticipation of post secondary programs coupled with the development of greater self confidence through academic success and effective communication.

7846 (NEI-DK–1771) **CO_2 taxation in the EU.** Skriftserie C. Institut for Erhvervs- og Samfundsbeskrivelse, 62. Tinggaard Svendsen, G. Handelshoejskolen i Aarhus (Denmark). Inst. for Erhvervs- og Samfundsbeskrivelse; Handelshoejskolen i Aarhus (Denmark). Jun 1994. 14p. Contract ENS-1753/93-0002. Order Number DE95737522. Source: OSTI; NTIS.

EFP-93.

In Europe, there is a vivid debate going on about application of economic instruments for environmental regulation. Whereas the U.S. has centered its academic discussions on tradable permits, Europe has chosen the tax road so far. The use of environmental taxes has not been satisfactory in terms of environmental quality so far, but perhaps Europe may benefit from the U.S. experiences in the future. This paper will focus on air pollution and carbon dioxide, that is, the problem of global warming and energy policies. After highlighting the theoretical aspects of the tax and tradable permit approach, the practical attempt to apply a CO_2 tax in the European Union, EU, is investigated. The CO_2 tax proposal has not yet been implemented in the EU. Several countries have opposed it on grounds of competitiveness and increased production coasts. Among the EU member countries, individual CO_2 taxes are only found in Denmark and the Netherlands. Denmark will here be treated as the main case - its CO_2 policy is by far the most ambitious and comprehensive in the EU. The vision of this paper is that alternatively the EU should try to use a tradable permit system for two reasons: first, the politically-defined reduction target may be realized and second, the political attractiveness of a grandfather design. (au) (21 refs.)

7847 (SAND–94-2533) **Prosperity Game: Advanced Manufacturing Day, May 17, 1994.** Berman, M. Sandia National Labs., Albuquerque, NM (United States). Dec 1994. 37p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. Order Number DE95004958. Source: OSTI; NTIS; GPO Dep.

Prosperity Games are an outgrowth and adaptation of move/countermove and seminar War Games. Prosperity Games are simulations that explore complex issues in a variety of areas including economics, politics, sociology, environment, education and research. These issues can be examined from a variety of perspectives ranging from a global, macroeconomic and geopolitical viewpoint down to the details of customer/supplier/market interactions in specific industries. All Prosperity Games are unique in that both the game format and the player contributions vary from game to game. This report documents a 90-minute Prosperity Game conducted as part of Advanced Manufacturing Day on May 17, 1994. This was the fourth game conducted under the direction of the Center for National Industrial Alliances at Sandia. Although previous games lasted from one to two days, this abbreviated game produced interesting and important results. Most of the strategies proposed in previous games were reiterated here. These included policy changes in international trade, tax laws, the legal system, and the educational system. Government support of new technologies was encouraged as well as government-industry partnerships. The importance of language in international trade was an original contribution of this game. The deliberations and recommendations of these teams provide valuable insights as to the views of this diverse group of decision makers concerning policy changes, foreign competition, and the development, delivery and commercialization of new technologies.

2903 Environment, Health, and Safety

Refer also to citation(s) 7424, 7465, 7542, 7576, 7579, 7783, 8010, 8456, 8523, 8525, 8526, 8527, 8528, 8529

7848 (ANL/DIS/PP–83052) **A comparison of noxious facilities' impacts for home owners versus renters.** Clark, D.E. (Marquette Univ., Milwaukee, WI (United States). Dept. of Economics); Nieves, L.A. Argonne National Lab., IL (United States). [1995]. 32p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. Order Number DE95004641. Source: OSTI; NTIS; INIS; GPO Dep.

The siting of noxious facilities, such as hazardous waste facilities, is often vigorously opposed by local residents, and thus it is now common for local residents to be compensated for the presence of the facility. One technique that has been employed to implicitly value noxious facilities is the intercity hedonic approach, which examines the wage and land rent premia between cities that result from the presence of the facility. However, most of the focus has been on the behavior of home owners as opposed to renters. Since these two groups of residents vary on numerous dimensions such as marital status, age, sex, and personal mobility, it would not be surprising to find different marginal valuations of local site characteristics. The authors use 1980 Census data to derive separate estimates for owners and renters of the implicit value placed on eight different types of noxious facilities. They find that renters and owners differ in their response to noxious facilities, although the differences are not systematic. Furthermore, the differences between owners and renters are not primarily due to differential mobility or socio-demographic factors. Controlling those factors decreases the differences between renters' and owners' implicit valuations of noxious facilities by less than 10%. Unmeasured differences between the two groups, such as tastes, risk aversion, or commitment to the community, must account for the remaining difference in valuations. These findings suggest that policymakers should separately consider the responses of owners and renters when estimating noxious facility impacts.

7849 (ANL/ESD–26) **Methods of valuing air pollution and estimated monetary values of air pollutants in various U.S. regions.** Wang, M.Q.; Santini, D.J.; Warinner, S.A. Argonne National Lab., IL (United States). Center for Transportation Research. Dec 1994. 92p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. Order Number DE95006854. Source: OSTI; NTIS; GPO Dep.

Air pollutant emission values are used to determine the social costs of various technologies that cause air pollution and to estimate the benefits of emission control technologies. In this report, the authors present two methods of estimating air pollutant emission values–the damage value method and the control cost method–and review 15 recent studies in which these methods were employed to estimate emission values. The reviewed studies derived emission values for only a limited number of areas; emission value estimates are needed for other US regions. Using the emission values estimated in the reviewed studies, they establish regression relationships between emission values, air pollutant concentrations, and total population exposed, and apply the established relationships to 17 US metropolitan areas to estimate damage-based and control-cost-based emission values for reactive organic gases, nitrogen oxides, particulate matter measuring less than 10 microns, sulfur oxides, and carbon monoxide in these areas. Their estimates show significant variations in emission values across the 17 regions.

7850 (CONF-9411177–Absts., [pp. n]) **Recent findings with respect to climate development.** Oeschger, H. (Bern Univ. (Switzerland). Physikalisches Inst.). Paul Scherrer Inst. (PSI), Villigen (Switzerland). 1994. [36p.] From Energy days 94; Villigen (Switzerland); 10-11 Nov 1994. In *Programme and book of abstracts*. Order Number DE95743548. Source: OSTI; NTIS.

Short communication CLIMATIC CHANGE; ICE/drill cores; VOLCANOES; GREENHOUSE EFFECT; CARBON DIOXIDE; GREENLAND; ICE; NUMERICAL DATA

7851 (DOE/EH–231-054/1294) **Ignitable, corrosive, reactive, and incompatible wastes information brief.** USDOE Assistant Secretary for Environment, Safety, and Health, Washington, DC (United States). Office of Environmental Guidance. Dec 1994. 5p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95005305. Source: OSTI; NTIS; GPO Dep.

Under RCRA Subtitle C, a solid waste can be deemed hazardous if, among other things, it exhibits one or more of the hazardous characteristics identified in 40 CFR 261, Subpart C. These characteristics are ignitability, corrosivity, reactivity, or toxicity. This information brief discusses issues related to the management of wastes exhibiting one or more of the three physical waste characteristics – ignitability, corrosivity, and reactivity. Generators of ignitable, corrosive and reactive wastes must take special precautions to ensure the safe handling of these wastes and to prevent any contact with other incompatible wastes or materials that could result in potentially dangerous situations. Regulatory definitions, an overview of the applicable compliance requirements, and special considerations for the safe handling of these characteristic hazardous or incompatible wastes are provided in this report.

7852 (DOE/EH–0447) **CERCLA §103 and EPCRA §304 Release Notification Requirements update.** USDOE Assistant Secretary for Environment, Safety, and Health, Washington, DC (United States). RCRA/CERCLA Div. Jan 1995. 32p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95006150. Source: OSTI; NTIS; GPO Dep.

This guidance document updates and clarifies information provided in an earlier guidance document published by the US Environmental Protection Agency (EPA) entitled Guidance for Federal Facilities on Release Notification Requirements under CERCLA and SARA Title III (EPA 9360.7-06; November 1990). Since publication of that earlier guidance document, several significant events have occurred that affect the reporting obligations of facilities owned or operated by the Department of Energy (DOE), including the publication of Executive Order 12856–Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements–and a rejection by the US Court of Appeals of EPA's interpretation of the term release into the environment. In preparing this guidance document, the Office of Environmental Policy and Assistance, RCRA/CERCLA Division (EH-413), has documented responses to queries from DOE field elements on CERCLA and EPCRA release reporting requirements, as well as incorporating those Questions and Answers from the previous document that remain germane to DOE's reporting obligations under CERCLA and EPCRA.

7853 (DOE/EW/50625–T21) **Environmental Hazards Assessment Program. Quarterly report, October–December 1994.** Medical Univ. of South Carolina, Charleston, SC (United States). 31 Jan 1995. 59p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG01-92EW50625. Order Number DE95005786. Source: OSTI; NTIS; GPO Dep.

The objectives of the Environmental Hazards Assessment Program (EHAP) are to: Develop a holistic, national basis for risk assessment, risk management, and risk communication that recognizes the direct impact of environmental hazards on the health and well-being of all; Develop a pool of talented scientists and experts in cleanup activities; Identify needs and develop programs addressing the critical shortage of well-educated, highly-skilled technical and scientific personnel to address the health oriented aspects of environmental restoration and waste management. This report describes activities and reports on progress for the second quarter (October - December 1994) of the third year of the grant. It reports progress against these grant objectives and the Program Implementation Plan.

7854 (DOE/OR/21981–T4) **Environmental monitoring report, May 10, 1993–June 1, 1994.** Tennessee Dept. of Environment and Conservation, Oak Ridge, TN (United States). DOE Oversight Div. 1 Sep 1994. 88p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG05-91OR21981. Order Number DE95004860. Source: OSTI; NTIS; INIS; GPO Dep.

The Tennessee Department of Environment and Conservation (TDEC) DOE Oversight Division (DOE-O) monitoring effort will serve as oversight with ongoing compliance and ambient sampling by Oak Ridge Reservation (ORR), Department of Energy (DOE) and contractor staff programs. These sources provide a comprehensive database which must be reviewed and analyzed in order to streamline DOE-O sampling efforts. DOE-O monitoring is necessary to provide quality control, to ensure compliance, to ensure completeness, and to assure protection of public health and the environment. The Tennessee Oversight Agreement (TOA), includes a section on Environmental Monitoring as Attachment A. To accomplish these objectives, DOE-O will implement the following monitoring programs: surface waters; ground water; air; fish and wildlife. In addition, radiation monitoring has been conducted in all of these areas.

7855 (DOE/OR/21981–T5) **Environmental monitoring plan, July 1–December 31, 1994.** Tennessee Dept. of Environment and Conservation, Oak Ridge, TN (United States). DOE Oversight Div. 1 Jul 1994. 52p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG05-91OR21981. Order Number DE95004861. Source: OSTI; NTIS; INIS; GPO Dep.

The Tennessee Department of Environment and Conservation, DOE Oversight Division (TDEC/DOE-O) under the terms of the Tennessee Oversight Agreement (TOA) are providing annual reports: reporting of State's monitoring and analysis, and findings of DOE's quality and effectiveness of DOE's monitoring and surveillance. This report blends some of both of the required annual reports as described in the TOA section A.7.2.2. The Federal Facilities Agreement (FFA) integrates the Resource Conservation and Recovery Act (RCRA) and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) for the Oak Ridge Reservation. This report presents the results of environmental monitoring in Tennessee in the following areas: surface waters; ground water; air; and fish and wildlife. In addition, radiation monitoring has been conducted in all of these areas.

7856 (DOE/PC/94227–T1) **Environmental impacts of ocean disposal of CO_2. First quarterly report, September 1–September 30, 1994.** Tester, J.W. Massachusetts Inst. of Tech., Cambridge, MA (United States). [1994]. 14p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-94PC94227. Order Number DE95006246. Source: OSTI; NTIS; INIS; GPO Dep.

This paper is divided into five sections (corresponding to five tasks) which all must be considered in order to determine the ultimate environmental impact of ocean disposal of CO_2. The sections are: ambient physical and chemical properties of the ocean; CO_2 loadings (i.e. quantities and purities of CO_2) produced using different capture technologies; methods of CO_2 transport and injection, and their associated physical/chemical perturbations; environmental impacts for the scenarios outlined in section the previous section; and other considerations including legal issues, public perception, and monitoring requirements.

7857 (ECON–39/93) **Cost-effective environmental policy to environmental problems from the transportation sector in cities.** Senter for Oekonomisk Analyse (ECON), Oslo (Norway). Mar 1994. 81p. (In Norwegian). Order Number DE95737646. Source: OSTI; NTIS.

The report deals with the pollution load from the transport sector in cities. The pollution problems are to be complex and complicated. The approach in this project is to work out a theoretical and methodical framework in order to secure that the different measures to transport are to be compared and evaluated in a way of consistency. Different decision models are developed for systematizing the base of decision. Such types of models and methods for estimating the environment, are discussed and compared. The pollution load in cities and the effects of different measures, are described. A proposal in systematizing the decision base for practical use, is presented. The discussions are related to the theoretical works and real analyses being executed in Norway and internationally. 70 refs., 5 figs., 3 tabs.

7858 (ECON–307/94) **Joint implementation of climatic measures.** Senter for Oekonomisk Analyse (ECON), Oslo (Norway). May 1994. 62p. (In Norwegian). Order Number DE95737647. Source: OSTI; NTIS.

The report gives an overview of the debate about joint implementation (JI), and evaluates the possible role of JI under the framework convention on climate change. The potential for JI is evaluated on the basis of different examinations of the costs of reducing CO_2-emissions in some countries. Important issues such as possible participants, measuring and crediting of emission reductions, how to choose JI projects etc. are discussed. One chapter describes two pilot projects in Poland and Mexico, and the experiences from these projects are discussed. The organizing JI between the Nordic countries and between these countries and Eastern Europe is discussed. The report also give examples of possible sectors and fields for JI both in the Nordic countries and in Eastern Europe. 30 refs., 7 figs., 3 tabs.

7859 (EGD-CERCLA–002/0790) **Catalog of CERCLA applicable or relevant and appropriate requirements (ARARs) - fact sheets.** USDOE Assistant Secretary for Environment, Safety, and Health, Washington, DC (United States). Office of Environmental Guidance and Compliance. Jul 1990. 92p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95005351. Source: OSTI; NTIS; GPO Dep.

Section 121(d) of the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), requires attainment of federal and state applicable or relevant and appropriate requirements (ARARs). Subpart E, Section 300.400(g) "Identification of applicable or relevant and appropriate requirements" of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP)(55 FR 8666, March 8, 1990) describes the process for attaining ARARs. The purpose of this catalog is to provide DOE Program Offices and Field Organizations with all of the "Quick Reference Fact Sheets" on attaining ARARS. These fact sheets provide overviews of ARARs for CERCLA cleanup actions pertinent to DOE environmental restoration activities. All of the fact sheets in this catalog were prepared by the Environmental Protection Agency's Office of Solid Waste and Emergency Response. Fact sheets 1-7 discuss land disposal restrictions (LDRs) and their applicability. LDRs may pertain to a number of CERCLA response actions at DOE facilities. Fact Sheets 8-13 are based on the CERCLA Compliance with Other Laws Manual: Parts I and II and provide an overview of many other CERCLA ARARs. Overview of ARARs-Focus on ARAR Waivers (fact sheet 11), provides a good introduction to ARARS. The last two fact sheets, 14 and 15, are periodic reports that describe additional fact sheets and clarify issues.

7860 (KAERI/RR–1284/93) **Economic analysis of nuclear power generation.** Song, Ki Dong (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Lee, Han Myeong; Lee, Man Kee; Moon, Ki Hwan; Kim, Seung Soo; Kim, Seong Ki; Lee, Yeong Ki. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Dec 1993. 84p. (In Korean). Order Number DE95613260. Source: OSTI; NTIS; INIS.

As CO_2 emission is recognized as the one of the major causes of the global worming, international CO_2 emission regulation has been of great concern and has been discussed actively on the global level. Several means of CO_2 emission regulation have been raised and have received much attention recently. CO_2 emission regulation is expected to affect the national economy as well as the national energy policy. Since the electricity sector closely interacts with CO_2 emission, environmental regulation has the possibility of implementation in this sector. Considering the enormous role played by electricity in the national economy, it is very important to study the effect of environmental regulation on the electricity sector. The main purpose of this study is to estimate the marginal cost of CO_2 emission by analyzing the effect of CO_2 emission regulation on the electricity sector in terms of capacity and generation mix. This information can be used effectively in energy policy establishment. In addition, the effect of CO_2 emission regulation on economic viability of electricity generating type is also being studied in order to contribute to the establishment of Electric System Expansion Planning in Korea.

7861 (KEMI–8-94) **Phasing out lead and mercury.** Freij, L. (ed.). National Chemicals Inspectorate, Solna (Sweden). Jul 1994. 70p. Order Number DE95737667. Source: OSTI; NTIS.

Current work to phase out the use of lead and mercury in Sweden started as a Governmental Commission in 1989 to the National Chemicals Inspectorate and the Swedish Environmental Protection Agency. Proposals for measures to restrict the use of such substances which may have particularly harmful effect on the environment were to be submitted. The work was reported in 'risk reduction of chemicals - a government commission report' and includes thirteen harmful substances. In 1991 Parliament passed a government bill (1990/91:90); in which proposals were made to - phase out the use of lead in the long-term, primarily through voluntary measures, - ban mercury in certain products, and to phase-out 75% of mercury usage by the year 2010, i.e. a long-term goal. In May 1991, the Government commissioned the National Chemicals Inspectorate and the Swedish Environmental Protection Agency to report the results of phasing out lead and mercury. This report is the Chemicals Inspectorate's contribution. It describes, so far, the successful Swedish activities on phasing out lead and mercury. 14 tabs

7862 (NEI-SE–185) **African voices on climate change. Policy concerns and potentials.** Silveira, S. Stockholm Environment Inst. (Sweden). 1994. 50p. Order Number DE95737650. Source: OSTI; NTIS; INIS.

This publication is the result of a process of building an understanding and facilitating a dialogue on the issues related to climate change, on the implications that climate change have to Africa, and on the relevance of the United Nations Framework Convention on Climate Change for the continent. Research work was carried out over a year and twelve African countries were directly engaged in this projects, contributing with the work and expertise of their specialists. A whole process of discussions was started aiming not only at identifying questions concerning the countries directly involved but at illustrating the diversity of Africa's economies and societies, and attempting to raise common issues of interest for the whole of the continent. The objective of this publication is to provide a starting point for the discussions to take place during the African Conference on Policy Options and Responses to Climate Change, 5-8 December 1994, in Nairobi. This conference is not only the culmination of 'Climate and Africa' but, most of all, it opens a forum for discussions on climate issues among African policy makers and for building African positions in relation to the Climate Convention. The ideas expressed here are drawn from the

material produced in the Climate and Africa Project. Therefore, this publication does not necessarily represent the positions of the Stockholm Environment Institute or the African Center for Technology Studies in relation to Africa and the Climate Convention.

7863 (NREL/TP–461-6684) **Issues and methods in incorporating environmental externalities into the integrated resource planning process.** Fang, J.M.; Galen, P.S. National Renewable Energy Lab., Golden, CO (United States). Nov 1994. 73p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC36-83CH10093. Order Number DE94011843. Source: OSTI; NTIS; GPO Dep.

This report is a review of current practices and policies in considering environmental externalities in the integrated resource planning and performance based regulation (IRP/PBR) process. The following issues are presented and examined: What are the pros and cons of treating environmental externalities in the IRP process? How are potential future environmental regulations being treated? Are externalities being qualitatively or quantitatively considered, or monetized? Are offsets being allowed? How are externality policies being coordinated among different levels and branches of governments? Should environmental externalities be considered in dispatching a utility's existing resources? What are the procedures for addressing uncertainty in incorporating environmental externalities into IRP? How are externalities valued? What are other approaches to addressing environmental externalities. This report describes seven major approaches for addressing environmental externalities in the IRP process: qualitative treatment, weighting and ranking, cost of control, damage function, percentage adders, monetization by emission, and multiattribute trade-off analysis. The discussion includes a taxonomy of the full range of alternative methods for addressing environmental externalities, a summary of state PUC actions, the role of state laws, the debate on environmental adders, and the choice of methodologies. In addition, this report characterizes the interests of stakeholders such as the electric industry, fuel suppliers, energy consumers, governmental agencies, public interest groups, consultants, and others. It appears that the views, positions, and interests of these stakeholders are affected by their perceptions of the potential impacts on their economic interests or the viability of their position on environmental policy, by the societal perspective they take, and by the orientation of the analysts toward market competition and their respective accumulated expertise.

7864 (PNL–10415) **Stakeholder involvement report for the Cryocell® demonstration at Hanford.** Vick, J.D. (Pacific Northwest Lab., Richland, WA (United States)); Peterson, T.S.; McCabe, G.H.; Niesen, K.A.; Serie, P.J. Pacific Northwest Lab., Richland, WA (United States). Jan 1995. 44p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. Order Number DE95006370. Source: OSTI; NTIS; INIS; GPO Dep.

The US Department of Energy (DOE) is evaluating frozen soil subsurface barriers as a way, to contain the spread of contamination. CRACKLE is one such technology being evaluated in terms of technical performance, operating requirements, and cost of deployment in and soils. The primary source of data for this evaluation will be a full-scale field demonstration to be conducted at an uncontaminated site at the Hanford Reservation during fiscal years 1994–1996. Experience has shown that not addressing stakeholder concerns early on in the process of technology development can lead to expending resources on remedial approaches that are ultimately not deployable. Therefore the CRACKLE project worked with stakeholders to help ensure that stakeholder issues and concerns, that if left unacknowledged could delay or block the deployment of the technology, were addressed during the technology's demonstration. The insights gained from stakeholder involvement in the CRACKLE demonstration project apply to other remediation technologies. Section IV and Appendix A of this report provide additional information about stakeholder comments. Understanding these insights will allow remedial project managers to anticipate issues of concern to stakeholders, to involve them effectively and to speed up technology development, deployment, and environmental cleanup.

7865 (PSI–94-10, pp. 11-17) **Insurable risk associated to climate change.** Weilenmann, U. (Winterthur Insurance, International Div., Winterthur (Switzerland)). Paul Scherrer Inst. (PSI), Villigen (Switzerland). Sep 1994. (CONF-9403197–: IPCC WG 3 writing team 2 meeting, Montreux (Switzerland), 3-6 Mar 1994). In *Steps towards a decision making framework to address climate change*. 144p. Order Number DE95743546. Source: OSTI; NTIS.

The paper deals with the following topics: lines of insurance impacted, the insurer's means of self-protection, the insurability of natural disaster risks in the future. 3 figs., 2 tabs., 3 refs.

7866 (SAND–94-3062C) **Ecological risk assessment benefits environmental management.** Fairbrother, A. (Ecological Planning and Toxicology, Inc., Corvallis, OR (United States)); Kapustka, L.A.; Williams, B.A.; Glicken, J. Sandia National Labs., Albuquerque, NM (United States). [1994]. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. (CONF-9411167–1: Ecological risk assessment: uses and abuses conference, Corvallis, OR (United States), 15-16 Nov 1994). Order Number DE95004554. Source: OSTI; NTIS; GPO Dep.

The ecological risk assessment process in its ideal form is an unbiased approach for assessing the probability of harm to the environment as a consequence of a given action. This information can then be combined with other societal values and biases in the management of such risks. However, as the process currently is understood, decision makers often are accused of manipulating information in order to generate decisions or achieve buy in from the public in support of a particular political agenda. A clear understanding of the nature of the risk management process can help define areas where information should be free from social or personal bias, and areas where values and judgments are critical. The authors do not propose to discuss the individual's decision-making process, but rather to address the social process of risk communication and environmentally-related decision-making, identifying which parts of that process require bias-free, scientifically generated information about the consequences of various actions and which parts need an understanding of the social values which underlie the informed choices among those possible actions.

7867 (SVF-O–97) **Evaluation of the prerequisites to adapt to the law on environmental charges on emission of nitrogen oxides in energy production at combustion plants producing 25-50 GWh/year.** Baeckstroem, S. (Vattenfall Utveckling AB, Vaellingby (Sweden)); Harnevie, H. Stiftelsen foer Vaermeteknisk Forskning, Stockholm (Sweden). Dec 1994. 24p. (In Swedish). Order Number DE95737673. Source: OSTI; NTIS.

Following the Swedish government decision of June 10th 1994, NO_x fees will apply to production units with a utilised energy production of at least 25 GWh during one calendar year. This new law comes into effect in two steps with the new limit 40 GWh/year as of January 1 st 1996 and 25 GWh/year as of January 1 st 1997. As an consequence of this, a large number of small furnaces, 6-10 MW, will be facing new demands regarding measuring and reporting amount of emitted nitrogen oxides. The requirements are the same as for the plants already involved in the NO_x fee system. The economical and practical abilities of these plants to meet the requirements are presently sparsely investigated and the trades concerned reports of widespread uncertainty. With the ambition to enlighten the matter, Vaermeforsk initiated the present study in May 1994. This subsequent report presents economical consequences for different plants concerned with the new fees, a presentation of available measuring instruments together with a cost/benefit analysis of such equipment. A suggested comparative study of the costs, availability and long-time operation of this equipment during the first year of operation is presented. It is suggested that 4-5 plants will be equipped with different measuring techniques and enrolled in the project. The suggested plants are 2-3 oil/gas fired together with 2 bio fired combustion plants. The plants will be equipped with 2 electrochemical measurement systems and 2 'stripped' versions of more established techniques. As a fit measuring system could an equipment able to continuously determine the NO_x level from general running parameters (such as temperature, O_2 concentration, the condition of the combustion air) be in rolled. 12 refs, 3 tabs

2904 Energy Resources

Refer also to citation(s) 7886

7868 (NEI-DK–1763) **Estimate of resources from wastes in Denmark.** Jysk-Fynske Elsamarbejde (ELSAM), Fredericia (Denmark); ELKRAFT A.m.b.A., Ballerup (Denmark); Slovakia Energy, Ballerup (Denmark). May 1994. 202p. (In Danish). Order Number DE95737518. Source: OSTI; NTIS.

An estimate of Danish resources of combustible municipal wastes, and their combustible values, is given in addition to a description of related current legislation. Suggestions are given as to the development of this form of fuel potential. According to the government's plan of management for re-use of wastes, 25% should be used as fuel in cogeneration plants. It is expected that the amount of wastes processed by incineration will increase by 25%, and that the volume of wastes deposited will decrease. (AB)

2905 Research, Development, Demonstration, and Commercialization

Refer also to citation(s) 7202, 7491, 7537, 7543, 7544, 7915, 7961, 8021, 8120, 8524, 8844, 9163

7869 (DOE/CR–0032) **FY 1996 Congressional budget request: Budget highlights.** Department of Energy, Washington, DC (United States). Office of the Controller. Feb 1995. 113p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95007104. Source: OSTI; NTIS; GPO Dep.

The FY 1996 budget presentation is organized by the Department's major business lines. An accompanying chart displays the request for new budget authority. The report compares the budget request for FY 1996 with the appropriated FY 1995 funding levels displayed on a comparable basis. The FY 1996 budget represents the first year of a five year plan in which the Department will reduce its spending by $15.8 billion in budget authority and by $14.1 billion in outlays. FY 1996 is a transition year as the Department embarks on its multiyear effort to do more with less. The Budget Highlights are presented by business line; however, the fifth business line, Economic Productivity, which is described in the Policy Overview section, cuts across multiple organizational missions, funding levels and activities and is therefore included in the discussion of the other four business lines.

7870 (DOE/ED–0006) **Forecast of Contracting and Subcontracting Opportunities, Fiscal year 1995.** USDOE Office of Small and Disadvantaged Business Utilization, Washington, DC (United States). [1995]. 61p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95006376. Source: OSTI; NTIS; GPO Dep.

Welcome to the US Department of Energy's Forecast of Contracting and Subcontracting Opportunities. This forecast, which is published pursuant to Public Low 100–656, "Business Opportunity Development Reform Act of 1988," is intended to inform small business concerns, including those owned and controlled by socially and economically disadvantaged individuals, and women-owned small business concerns, of the anticipated fiscal year 1995 contracting and subcontracting opportunities with the Department of Energy and its management and operating contractors and environmental restoration and waste management contractors. This document will provide the small business contractor with advance notice of the Department's procurement plans as they pertain to small, small disadvantaged and women-owned small business concerns.Opportunities contained in the forecast support the mission of the Department, to serve as advocate for the notion's energy production, regulation, demonstration, conservation, reserve maintenance, nuclear weapons and defense research, development and testing, when it is a national priority. The Department's responsibilities include long-term, high-risk research and development of energy technology, the marketing of Federal power, and maintenance of a central energy data collection and analysis program. A key mission for the Department is to identify and reduce risks, as well as manage waste at more than 100 sites in 34 states and territories, where nuclear energy or weapons research and production resulted in radioactive, hazardous, and mixed waste contamination. Each fiscal year, the Department establishes contracting goals to increase contracts to small business concerns and meet our mission objectives.

7871 (DOE/ER–0635) **Summaries of FY 1994 engineering research.** USDOE Office of Energy Research, Washington, DC (United States). Office of Basic Energy Sciences. Dec 1994. 71p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95005656. Source: OSTI; NTIS; INIS; GPO Dep.

This report documents the Basic Energy Sciences Engineering Research Program for fiscal year 1994; it provides a summary of each of the program projects in addition to a brief program overview. The report is intended to provide staff of Congressional committees, other executive departments, and other DOE offices with substantive program information so as to facilitate governmental overview and coordination of Federal research programs. Of equal importance, its availability facilitates communication of program information to interested research engineers and scientists.

7872 (DOE/S–0069-Vol.1) **Transition report, United States Department of Energy: A report to the President-Elect. Volume 1.** USDOE, Washington, DC (United States). Nov 1988. 351p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95004882. Source: OSTI; NTIS; GPO Dep.

This report is a description of the Department of Energy organization and projects. The topics of the report include: (1) DOE organization and overview; (2) Headquarters Offices: Congressional, Intergovernmental and Public Affairs; Conservation and Renewable Energy; Contract Appeals; Defense Programs; Economic Regulatory Administration; Energy Information Administration; Energy Research; Environment, Safety and Health; Fossil Energy; General Counsel; Hearings and Appeals; Inspector General; International Affairs and Energy Emergencies; Management and Administration; Minority Economic Impact; New Production Reactors; Nuclear Energy; Policy, Planning and Analysis; Radioactive Waste Management; (3) Operations Offices: Albuquerque Operations Office; Chicago Operations Office; Idaho Operations Office; Nevada Operations Office; Oak Ridge Operations Office; Richland Operations Office; San Francisco Operations Office; Savannah River Operations Office; Laboratories; and (4) Power Administrations: Bonneville Power Administration; Western Area Power Administration.

7873 (DOE/S–0069-Vol.2) **Transition report, United States Department of Energy: A report to the President-Elect. Volume 2.** USDOE, Washington, DC (United States). Nov 1988. 225p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95004883. Source: OSTI; NTIS; GPO Dep.

This report is a description of the Department of Energy transition issues. The topics of the report include: Congressional, Intergovernmental and Public Affairs; Conservation and Renewable Energy; Defense Programs; New Production Reactors; Economic Regulatory Administration; Energy Information Administration; energy research; environment, safety and health; fossil energy; General Counsel; hearings and appeals, Inspector General, international affairs and energy emergencies; management and administration, minority economic impact; nuclear energy; policy, planning and analysis, radioactive waste management; and power marketing administrations: Bonneville Power Administration, Western Area Power Administration, Alaska Power Administration, Southeastern Power Administration, and Southwestern Power Administration.

7874 (DOE/TP–0001) **Technology transfer 1995.** USDOE, Washington, DC (United States). Jan 1995. 167p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95004241. Source: OSTI; NTIS; GPO; GPO Dep.

Single copies are available free from OSTI. Multiple copies, contact OSTI for charge.

Technology Transfer 1995 is intended to inform the US industrial and academic sectors about the many opportunities they have to form partnerships with the US Department of Energy (DOE) for the mutual advantage of the individual institutions, DOE, and the nation as a whole. It also describes some of the growing number of remarkable achievements resulting from such partnerships. These partnership success stories offer ample evidence that Americans are learning how to work together to secure major benefits for the

nation–by combining the technological, scientific, and human resources resident in national laboratories with those in industry and academia. The benefits include more and better jobs for Americans, improved productivity and global competitiveness for technology-based industries, and a more efficient government laboratory system.

7875 (NREL/SP–336-7233) **National Renewable Energy Laboratory information resources catalogue. A collection of energy efficiency and renewable energy information resources.** National Renewable Energy Lab., Golden, CO (United States). 1994. 80p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC36-83CH10093. Order Number DE94011900. Source: OSTI; NTIS; GPO Dep.

NREL's first annual Information Resources Catalogue is intended to inform anyone interested in energy efficiency and renewable energy technologies of NREL's outreach activities, including publications and services. For ease of use, all entries are categorized by subject. The catalogue is separated into six main sections. The first section lists and describes services that are available through NREL and how they may be assessed. The second section contains a list of documents that are published by NREL on a regular or periodic basis. The third section highlights NREL's series publications written for specific audiences and presenting a wide range of subjects. NREL's General Interest Publications constitute the fourth section of the catalogue and are written for nontechnical audiences. Descriptions are provided for these publications. The fifth section contains Technical Reports that detail research and development projects. The section on Conference Papers/Journal Articles/Book Chapters makes up the sixth and final section of the catalogue.

7876 (ORNL/PPA–94/4) **Oak Ridge National Laboratory Core Competencies.** Roberto, J.B. (and others); Anderson, T.D.; Berven, B.A.; Hildebrand, S.G.; Hartman, F.C.; Honea, R.B.; Jones, J.E. Jr.; Moon, R.M. Jr.; Saltmarsh, M.J.; Shelton, R.B. Oak Ridge National Lab., TN (United States). Dec 1994. 59p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE95004833. Source: OSTI; NTIS; GPO Dep.

A core competency is a distinguishing integration of capabilities which enables an organization to deliver mission results. Core competencies represent the collective learning of an organization and provide the capacity to perform present and future missions. Core competencies are distinguishing characteristics which offer comparative advantage and are difficult to reproduce. They exhibit customer focus, mission relevance, and vertical integration from research through applications. They are demonstrable by metrics such as level of investment, uniqueness of facilities and expertise, and national impact. The Oak Ridge National Laboratory (ORNL) has identified four core competencies which satisfy the above criteria. Each core competency represents an annual investment of at least $100M and is characterized by an integration of Laboratory technical foundations in physical, chemical, and materials sciences; biological, environmental, and social sciences; engineering sciences; and computational sciences and informatics. The ability to integrate broad technical foundations to develop and sustain core competencies in support of national R&D goals is a distinguishing strength of the national laboratories. The ORNL core competencies are: 9 Energy Production and End-Use Technologies o Biological and Environmental Sciences and Technology o Advanced Materials Synthesis, Processing, and Characterization & Neutron-Based Science and Technology. The distinguishing characteristics of each ORNL core competency are described. In addition, written material is provided for two emerging competencies: Manufacturing Technologies and Computational Science and Advanced Computing. Distinguishing institutional competencies in the Development and Operation of National Research Facilities, R&D Integration and Partnerships, Technology Transfer, and Science Education are also described. Finally, financial data for the ORNL core competencies are summarized in the appendices.

7877 (PNL–9410-4) **The AMTEX Partnership™. Fourth quarter report, September 1994.** Lemon, D.K.; Quisenberry, R.K. Pacific Northwest Lab., Richland, WA (United States). Jun 1994. 38p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. Order Number DE95005717. Source: OSTI; NTIS; GPO Dep.

The AMTEX Partnership™ is a collaborative research and development program among the US Integrated Textile Industry, the Department of Energy (DOE), the DOE laboratories, other federal agencies and laboratories, and universities. The goal of AMTEX is to strengthen the competitiveness of this vital industry, thereby preserving and creating US jobs. The operational and program management of the AMTEX Partnership is provided by the Program Office. This report is produced by the Program Office on a quarterly basis and provides information on the progress, operations, and project management of the partnership.

7878 (PNL–10258) **Staff exchange with Spokane Intercollegiate Research and Technology Institute (SIRTI), final project report.** Alexander, G.M. Pacific Northwest Lab., Richland, WA (United States). Dec 1994. 64p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. Order Number DE95004948. Source: OSTI; NTIS; GPO Dep.

Staff exchanges, such as the one described in this report, are intended to facilitate communication and collaboration among scientists and engineers at Department of Energy (DOE) laboratories, in U.S. industry, and academia. Funding support for these exchanges is provided by the DOE, Office of Energy Research, Laboratory Technology Transfer Program. Funding levels for each exchange typically range from $20,000 to $40,000. The exchanges offer the opportunity for the laboratories to transfer technology and expertise to industry, gain a perspective on industry's problems, and develop the basis for further cooperative efforts through Cooperative Research and Development Agreements (CRADAS) or other mechanisms.

7879 (RISO-R–785(DA)) **Three-year plan (1995-1997) for the activities of Risoe National Laboratory.** Risoe National Lab., Roskilde (Denmark). Jan 1995. 44p. (In Danish). Order Number DE95737570. Source: OSTI; NTIS; Also available from Risoe Library, P.O. Box 49, DK-4000 Roskilde, Denmark.

This three-year plan describes the activities of Risoe National Laboratory in the period 1995-1997. Risoe National Laboratory belongs under the Danish Ministry of Research and concentrates on strategic research within energy, environment and materials. (au)

7880 (SAND–94-2257) **Physical and Chemical Sciences Center: Research briefs. Volume 9-94.** Vook, F.L.; Samara, G.A. (eds.). Sandia National Labs., Albuquerque, NM (United States). 1994. 98p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. Order Number DE95005443. Source: OSTI; NTIS; GPO Dep.

As Sandia National Laboratories and the Physical and Chemical Sciences Center develop an increasingly diverse set of customers, research partners, and Cooperative Research and Development Agreements (CRADA's) with industry, there is a need for providing more concise information describing the technical achievements and capabilities. This publication, Research Briefs, is designed to inform the present and potential partners in research and technology advancement. The research emphasizes semiconductor physics, electronic materials, surface physics and chemistry, plasma and chemical processing sciences, lasers and optics, vision science, ion-solid interactions and defect physics, and advanced materials physics. The specific programs pursued are driven by the research goals which are greatly influenced by interactions with the government and industrial customers.

7881 (SEAB–95006873) **Alternative futures for the Department of Energy National Laboratories.** Secretary of Energy Advisory Board, Washington, DC (United States). Feb 1995. 78p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95006873. Source: OSTI; NTIS; GPO Dep.

This Task Force was asked to propose alternate futures for the Department of Energy laboratories noted in the report. The authors' intensive ten months' study revealed multiple missions and submissions–traditional missions and new missions–programs and projects–each with factors of merit. They respectively suggest that the essence of what the Department, and particularly the laboratories, should and do stand for: the energy agenda. Under the overarching energy agenda–the labs serving the energy

opportunities–they comment on their national security role, the all important energy role, all related environmental roles, the science and engineering underpinning for all the above, a focused economic role, and conclude with governance/organization change recommendations.

2906 Nuclear Energy

Refer also to citation(s) 7313, 7780, 8068

7882 (INIS-mf–14433) **Selected legal documents in the field of peaceful uses of nuclear energy in the Czech Republic.** Bezpecnost Jadernych Zarizeni, no.5. Statni Urad pro Jadernou Bezpecnost, Prague (Czech Republic). 1994. 187p. (In Czech). Order Number DE95613296. Source: OSTI; NTIS (US Sales Only); INIS.

English translation available from Nuclear Information Center, 156 16 Prague-Zbraslav, Czech Republic, at USD 10.- per typewritten page.

Reproduced are full texts or parts of selected acts, regulations, decrees and other applicable Czech legal documents dealing with state surveillance over nuclear safety of nuclear facilities and of the environment, construction of nuclear facilities, non-proliferation of nuclear weapons, accountancy of and control over nuclear materials, nuclear safety, radioactive wastes, and ways to ensure safety and security in nuclear power and related industrial sectors. (J.B.).

7883 (KAERI/RR–1204/92) **Analysis of the trend in international nuclear affairs -With reference to nuclear policy development in the UK-.** Kim, Hwa Sup: Yang, Maeng Ho (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Ham, Chul Hoon; Kim, Hyun Jun; Cho, Suk Hong; Lee, Dong Jin; Kim, Ji Whan; Kim, Jong Sook; Yun, Yung Woo. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Dec 1992. 148p. (In Korean). Order Number DE95613277. Source: OSTI; NTIS; INIS.

The objective of this study is to identify the role of nuclear energy in UK's energy policies to analyse her nuclear policies, and to extract implications in setting up the Korean nuclear policy. this study briefly reviews the status of social system, energy resources/demand/supply, and nuclear energy uses in the UK. The history of nuclear development policy in the UK is also summarized. Furthermore, this study looks into the present and future nuclear policy of the country, describing progress of the power industry, development of FBR, radwaste management, nuclear damage compensation system, and so on in detail. Finally, some characteristics of the UK's nuclear policy including review of the cooperation agreement for nuclear energy between Korea and the UK are identified, and some implications from these are also suggested as conclusions. (Author).

7884 (SLU-REK-R–74) **Interview-survey of farmers. Experiences after the Chernobyl accident.** Karlen, G. Swedish Univ. of Agricultural Sciences, Uppsala (Sweden). Dept. of Radioecology. 1994. 13p. (In Swedish). Order Number DE95616129. Source: OSTI; NTIS; INIS.

71 farm households in contaminated areas of Sweden were interviewed at visits to farms, where measurements of the contamination of pastures and fields had been made. The aim of the survey was to find out what remedial actions had been taken by the farmers, what their appreciation of the information from authorities was, how the Chernobyl accident had affected their situation, and if they were prepared to take similar actions in case of a new accident. 15 refs.

2907 Transport and Storage

Refer also to citation(s) 7282

2910 Conservation

Refer also to citation(s) 8027

2920 Supply, Demand, and Forecasting

Refer also to citation(s) 7232, 7236, 7249, 7906

7885 (DOE/EIA–0538(94/95-15)) **Winter fuels report. Week ending: January 20, 1995.** USDOE Energy Information Administration, Washington, DC (United States). Office of Oil and Gas. Jan 1995. 87p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95005670. Source: OSTI; NTIS; GPO Dep.

The Winter Fuels Report is intended to provide concise, timely information to the industry, the press, policymakers, consumers, analysts, and State and local governments on the following topics: distillate fuel oil net production, imports and stocks on a U.S. level and for all Petroleum Administration for Defense Districts (PADD) and product supplied on a US level; propane net production, imports and stocks on a US level and for PADD's 1, 2, and 3; natural gas supply and disposition and underground storage for the US and consumption for all PADD's; as well as selected National average prices. Residential and wholesale pricing data for heating oil and propane for those States participating in the joint Energy Information Administration (EIA)/State Heating Oil and Propane Program; crude oil and petroleum price comparisons for the US and selected cities; and a 6–10 Day, 30-Day, and 90-Day outlook for temperature and precipitation and US total heating degree-days by city.

7886 (DOE/EIA–M069/A) **Appendix model performance - model documentation renewable fuels module of the National Energy Modeling System.** USDOE Energy Information Administration, Washington, DC (United States). Office of Integrated Analysis and Forecasting. Sep 1994. 12p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95006080. Source: OSTI; NTIS; GPO Dep.

This appendix discusses performance aspects of the Renewable Fuels Module (RFM). It is intended to present the pattern of response of the RFM to typical changes in its major inputs from other NEMS modules. The overall approach of this document, with the particular statistics presented, is designed to be comparable with similar analyses conducted for all of the modules of NEMS. While not always applicable, the overall approach has been to produce analyses and statistics that are as comparable as possible with model developer's reports for other NEMS modules. Those areas where the analysis is somewhat limited or constrained are discussed. Because the RFM consists of independent submodules, this appendix is broken down by submodule.

7887 (FOA-R–94-00022-1.2) **Use of Power? EPIK - Energy Problems in Wartime.** Frost, C.; Molin, S. National Defence Research Establishment, Stockholm (Sweden). Dept. of Defence Analysis. Oct 1994. 48p. (In Swedish). Order Number DE95737684. Source: OSTI; NTIS.

The EPIK project - Energy problems in Wartime - treats the problem of electricity demand during a swift and sudden military attack against the Stockholm area. The study focuses on those activities which are necessary to support the total national defence system and secure the survival of the population. In this context, certain activities and societal functions have very high priority. These include: civil command structures; information, communication and alarm functions; mobilization; the police and defence forces; civil defence and shelter; provision of water, food, medicine and certain industrial goods; emergency hospital treatment and nursing. In order to secure such activities, a number of physical systems - in this case particular objects - must function. The amount of electrical power required for these objects as well as for housing and less important high-consumption customers, is compared to the local electrical production capacity. From this comparison we can deduce if it is possible for defence planning to achieve its goals. The possibility of supplying these objects with electric power is discussed, as well as possible ways to minimize unnecessary consumption. We discuss mainly total electricity demand, production and distribution on a local level, different control mechanisms and power reserves. We discuss two possibilities for subsistence for the population - -food and heating at home vs. collective meals in public places such as schools - and show how electrical power consumption differs in these two cases. 8 refs, 5 figs

2930 Policy, Legislation, and Regulation

Refer also to citation(s) 7235, 7237, 7282, 7859, 7862, 7865, 7867, 8027, 8048

7888 (CONF-8810273–) **US–Japan energy policy consultations.** Atlantic Council of the United States, Washington, DC (United States). 1989. 126p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG01-88IE10688. From US-Japan energy policy consultations meeting; Mauna Kea, HI (United States); 16-18 Oct 1988. Order Number DE89003853. Source: OSTI; NTIS; INIS.

These papers, from the US–Japan Energy Policy Consultations Meeting in Hawaii, deal with topics relating to: energy outlook; electric utilities; nuclear energy; coal and petroleum based energies; and new energy source development. (JF)

7889 (NEI-DK–1766) **Energy saving consultancy and training in Latvia. Final report for phases C1, D and E1 with an update for phases A and B.** Birch og Krogboe A/S, Virum (Denmark). Nov 1994. 29p. Contract IMOe-427. Order Number DE95737524. Source: OSTI; NTIS.

In cooperation with: Latvian Energy Agency; Ministry of Education, Riga; Ministry of the Environment and Regional Affairs, Riga; Riga Technical University; Firma NAMS Ltd., Riga (Latvia); State Building Research Institute; Danfoss A/S; Villadsen Tagentreprise A/S; Grundofs A/S; Monies og Andersen A/S; DAFA A/S; Ravn Vinduer og Doere A/S (Denmark).

A full summary of the conclusion and recommendations for phases A (Information Campaign on Energy Savings) and B (Building Audits) may be found in the Final Report for Phases A and B published in December 1992. However, a brief up-date may be appropriate. With regard to energy saving information activities (Phase A) it should be noted that the brochure on energy savings produced during the project is still being distributed (by the OPET Office in Riga) in Latvia. Birch and Krogboe together with Danish advertising agency Information group has won an international competition for the EBRD funded project 'Latvia: Energy Awareness Conservation Campaign'. The start of the project has been delayed, but it is expected to start soon with a deadline set for October 1994. This project can be seen as a continuation on a larger scale of the activities started in the fall of 1992 within the framework of the present project. It is not known to us to what extent the building audit reports (Phase B) have been used or are being used for instructional or other purposes. The recommendations of one of the audits, Secondary School No. 3 in Riga, is being implemented at the moment (Phase C1). Work on revision of the Latvian Building Code (phase D9) began in February 1994, with six months delay. The work was carried out by Birch and Krogboe staff together with a private Latvian consultant from NAMS Ltd. The concept behind the project, that is a gradual process of audits, information, lectures, seminars, consultancy and demonstration projects aiming at transfer of know-how was destroyed because funding was made available only in installments with irregular intervals over a period of more than two years. Despite all the delays, unexpected problems and difficulties it is our conclusion that much valuable and long lasting work has been accomplished. (EG)

7890 (PSI–94-10) **Steps towards a decision making framework to address climate change.** Pillet, G. (Paul Scherrer Inst. (PSI), Villigen (Switzerland)); Gassmann, F. (eds.). Paul Scherrer Inst. (PSI), Villigen (Switzerland). Sep 1994. 144p. (CONF-9403197–: IPCC WG 3 writing team 2 meeting, Montreux (Switzerland), 3-6 Mar 1994). Order Number DE95743546. Source: OSTI; NTIS.

This report from the Montreux IPCC III writing team II meeting assembles papers that evolved from that meeting. They are organised around three main entries, as follows: - appreciation of climate change prospects and consequences, - constituents and variations to existing economic decision making frameworks, - integrated views or layouts showing candidate frameworks to address climate change under uncertainty and risk. (author) figs., tabs., refs.

7891 (PSI–94-10, pp. 3-9) **"Abrupt change" scenarios. Global scenarios revisited with respect to emerging scientific insights.** Gassmann, F. (Paul Scherrer Inst. (PSI), Villigen (Switzerland)). Paul Scherrer Inst. (PSI), Villigen (Switzerland). Sep 1994. (CONF-9403197–: IPCC WG 3 writing team 2 meeting, Montreux (Switzerland), 3-6 Mar 1994). In *Steps towards a decision making framework to address climate change.* 144p. Order Number DE95743546. Source: OSTI; NTIS.

The anthropogenic nature of CO_2-increase found wide acceptance in the scientific world and caused public concern. However, this acceptance does not yet mean an acceptance of anthropogenic climate change. In this paper, two "abrupt change" scenarios are proposed in addition to the "classical" scenario characterised by gradual warming. (author) 2 figs., tabs., 8 refs.

7892 (PSI–94-10, pp. 19-29) **Global warming damage and the risk of a climate catastrophe.** Fankhauser, S. (University Coll., London (United Kingdom)). Paul Scherrer Inst. (PSI), Villigen (Switzerland). Sep 1994. (CONF-9403197–: IPCC WG 3 writing team 2 meeting, Montreux (Switzerland), 3-6 Mar 1994). In *Steps towards a decision making framework to address climate change.* 144p. Order Number DE95743546. Source: OSTI; NTIS.

This paper illustrates the economic costs and consequences of a climate catastrophe. While some information exist about the impacts of extreme weather events, the question of high impact and (presumably) low probability events is also rather speculative. In the paper we will provide some illustrative figures for both aspects. (author) 2 figs., 1 tab., 19 refs.

7893 (PSI–94-10, pp. 33-40) **Climate change and discount rates.** Schubert, R. (Eidgenoessische Technische Hochschule, Zurich (Switzerland)). Paul Scherrer Inst. (PSI), Villigen (Switzerland). Sep 1994. (CONF-9403197–: IPCC WG 3 writing team 2 meeting, Montreux (Switzerland), 3-6 Mar 1994). In *Steps towards a decision making framework to address climate change.* 144p. Order Number DE95743546. Source: OSTI; NTIS.

When evaluating actions which directly or indirectly produce climate change effects, it seems reasonable to use a positive, yet small discount rate. This result is based on a weighing up different arguments in favor of $r>0$ or $r=0$ as well as of arguments for a high or a low discount rate respectively. Because of the high sensitivity of present values of costs and benefits with respect to the discount rate's value, the determination of this rate should be undertaken quite carefully. Empirical investigations might be helpful as well as for determining effectively used rates as well as for their adaptation to desired levels. (author) 23 refs.

7894 (PSI–94-10, pp. 41-49) **On the opportunity cost of climate change and policy.** Hediger, W. (Paul Scherrer Inst. (PSI), Villigen (Switzerland)). Paul Scherrer Inst. (PSI), Villigen (Switzerland). Sep 1994. (CONF-9403197–: IPCC WG 3 writing team 2 meeting, Montreux (Switzerland), 3-6 Mar 1994). In *Steps towards a decision making framework to address climate change.* 144p. Order Number DE95743546. Source: OSTI; NTIS.

The opportunity cost of climate change cannot be evaluated without an explicit formulation of policy targets, and without value judgements. However, if a clear statement about the scope, in time and space, is internationally agreed, the concept of opportunity cost can provide a helpful tool to enable rational choice, and finally achieve a transition towards sustainable development. (author) 24 refs.

7895 (PSI–94-10, pp. 51-65) **Decision-making under environmental uncertainty.** Faucheux, S. (Paris Univ., Pantheon-Sorbonne, Paris (France)); Froger, G. Paul Scherrer Inst. (PSI), Villigen (Switzerland). Sep 1994. (CONF-9403197–: IPCC WG 3 writing team 2 meeting, Montreux (Switzerland), 3-6 Mar 1994). In *Steps towards a decision making framework to address climate change.* 144p. Order Number DE95743546. Source: OSTI; NTIS.

The paper's main concern is with different decision-making models for environmental issues and with the hypotheses of rationality underlying such models. The thesis supported here is that the most environmental problems such as the increase of the greenhouse effect, the hole of the ozone layer or the loss of biodiversity, are situated in a context being at the same time of uncertainty, of irreversibility and of complexity. We shall explain why stressing the role of these elements implies a reversal of the traditional attitude towards decision-making. This presupposes a paradigm of economic rationality much broader than that of orthodox economics, called procedural rationality. Our paper is in two parts. The first part concerns the limits of the stochastic environmental approaches based on the Bayesian decision theory and on a substantive rationality hypothesis. Such approaches cannot take into consideration the environmental uncertainty and its implications, especially the

irreversibility. The second part concerns the decision-making analyses based upon the hypothesis of bounded and/or procedural rationality, as well as their ability to take account of the interactions between uncertainty, irreversibility and complexity. (author) 1 tab., refs.

7896 (PSI–94-10, pp. 67-74) **Environmental problems and attitudes towards risk and uncertainty.** Beltratti, A. (Torino Univ., Istituto Prato, Torino (Italy)). Paul Scherrer Inst. (PSI), Villigen (Switzerland). Sep 1994. (CONF-9403197–: IPCC WG 3 writing team 2 meeting, Montreux (Switzerland), 3-6 Mar 1994). In *Steps towards a decision making framework to address climate change.* 144p. Order Number DE95743546. Source: OSTI; NTIS.

The paper considers different models of decision-making under risk and uncertainty, pointing out that ignorance about future consequences (that is the presence of uncertainty in the sense of Knight) is by itself not a justification for postponement of action conductive to insurance. In fact models of non-linear probabilities or maximin expected utility suggest that a situation where the range of the unknown is large, as in the climate change issue, should induce, ceteris paribus, a large reaction in terms of precautionary defensive expenditures. (author) 12 refs.

7897 (PSI–94-10, pp. 77-97) **Decision making framework to address climate change.** Parikh, J. (Indira Gandhi Inst. of Development Research, Bombay (India)); Babu, P.G.; Parikh, K. Paul Scherrer Inst. (PSI), Villigen (Switzerland). Sep 1994. (CONF-9403197–: IPCC WG 3 writing team 2 meeting, Montreux (Switzerland), 3-6 Mar 1994). In *Steps towards a decision making framework to address climate change.* 144p. Order Number DE95743546. Source: OSTI; NTIS.

The threat of global warming and consequent climate change due to accumulation of greenhouse gases in the atmosphere poses a number of challenges. Policy decisions to address climate change have to be in a complex setting that involves issues of ethics, equity and uncertainty. We need to formulate response strategies to answer some important questions in the global warming context. The purpose of this paper is to explore how should one answer these questions. In other words, what should be our decision making framework for the immediate actions needed and for the long term horizon? (author) 2 figs., refs.

7898 (PSI–94-10, pp. 99-109) **Global environmental risks and financial instruments.** Chichilnisky, G. (Stanford Univ., Dep. of Economics, Stanford (United States)). Paul Scherrer Inst. (PSI), Villigen (Switzerland). Sep 1994. (CONF-9403197–: IPCC WG 3 writing team 2 meeting, Montreux (Switzerland), 3-6 Mar 1994). In *Steps towards a decision making framework to address climate change.* 144p. Order Number DE95743546. Source: OSTI; NTIS.

Does the existence of uncertainty about the timing and magnitude of climate change imply that there is no need for action now, and that decisions can be postponed until some of the uncertainties are resolved? This paper sets out a framework for thinking about this issue, and argues that action to curb the risk of climate change can be viewed and justified as an insurance policy: it is often prudent to insure against potentially harmful events even if there is considerable uncertainty about whether they will occur. The paper discusses a range of financial instruments which can be used to hedge against environmental risks, including mutual insurance contracts, and securities such as CAT Futures. It also discusses the North-South aspects of global environmental risks: most of the carbon emitted originates in the industrial countries, while the most harmful effects are generally predicted to fall disproportionately on the poorest regions on the earth. (author) 7 refs.

7899 (PSI–94-10, pp. 111-114) **Portfolio analysis model of climate change decision making.** Haites, E.F. (Barakat and Chamberlin, Toronto (Canada)). Paul Scherrer Inst. (PSI), Villigen (Switzerland). Sep 1994. (CONF-9403197–: IPCC WG 3 writing team 2 meeting, Montreux (Switzerland), 3-6 Mar 1994). In *Steps towards a decision making framework to address climate change.* 144p. Order Number DE95743546. Source: OSTI; NTIS.

Climate change policy decisions can be compared to investment portfolio decisions. Numerous policy measures are available to limit the impacts of climate change. Countries will typically implement several of these policy measure since no one measure is clearly superior. The decision then is to choose the portfolio of policy measures best suited to the country's circumstances and to adjust the portfolio over time in response to new developments. (author)

7900 (PSI–94-10, pp. 115-137) **Betting on climate states. The impact of climate change prospects on decision making under "strong" uncertainty and collective risks.** Pillet, G. (Paul Scherrer Inst. (PSI), Villigen (Switzerland)). Paul Scherrer Inst. (PSI), Villigen (Switzerland). Sep 1994. (CONF-9403197–: IPCC WG 3 writing team 2 meeting, Montreux (Switzerland), 3-6 Mar 1994). In *Steps towards a decision making framework to address climate change.* 144p. Order Number DE95743546. Source: OSTI; NTIS.

Climate change prospects have an impact on uncertainty and risk, as we ordinarily understand these expressions. In this paper, I check this by clarifying the distinction between risk and uncertainty with respect to global environmental problems, and consider the implications in relation to the decision making process. Lack of data and knowledge, less dependable probability distributions, gaps between competence and difficulty (agents are not able to figure out all of the complexities of a nature-economy system), small contributions of information from a number of diverse sources, and the global dimension of environmental risks make uncertainty stronger and risk collective. This phenomenon and attached consequences are called the uncertainty effect. I describe this effect with the help of a simplified two period world model with a depletable stock of natural resource and unknown utility from the second period. Consequences are similar to the ones from a discounted utilitarian perspective: Consumption today dominates the equation whereas distant in time utility, being strongly uncertain, is heavily discounted. Yet, in as far a strong uncertainty characterises long-run environmental problems with costs up front and benefits far into the future, a specific decision making framework must be explored if one wants to address an ecological-economic perspective. Surprisingly, this does not establish that, ceteris paribus, international conventions and attached conventional strategies are the only means at hand as guides to decision making under these conditions. It turns out that there is room for an alternative market framework to be implemented in relation to Arrow securities and inter-regional markets for climate positions. This market framework is apt at solving the ecological-economic long run equation by hedging against unexpected climate change associated "strong" uncertainties and collective risks. (author) 7 figs., 1 tab., refs.

2940 Fossil Fuels

Refer also to citation(s) 7202, 7232, 7233, 7236, 7237, 7249, 7885, 7913

7901 (ETDE-DE–11) **FIGAWA. Annual report 1991.** Bundesvereinigung der Firmen im Gas- und Wasserfach e.V. (FIGAWA), Koeln (Germany). [1992]. 67p. (In German). Order Number DE95738875. Source: OSTI; NTIS (US Sales Only).

The activities of the various departments and working groups of the Association in 1991 are reported. The Association was founded for the purpose of promoting science and engineering in the gas and water supply sector. (NA)

7902 (IFP–41456) **Hydrodenitrogenation mechanism of aromatic amines. Kinetic study and simulation.** D'Araujo, P.A.P. Institut Francais du Petrole (IFP), 92 - Rueil-Malmaison (France); Poitiers Univ., 86 (France). Jun 1994. 344p. (In French). Order Number DE95612595. Source: OSTI; NTIS (US Sales Only); INIS.

The decomposition of model molecules reacting alone or in competition was studied in a fixed bed reactor at 623 K and 7 MPa over a sulfided $NiMo/Al_2O_3$ catalyst. The inhibiting effect of H_2S and some nitrogen molecules, namely quinoline type compounds plays a major role in the transformation of anilines intermediates. On the other hand H_2S acts as a cocatalyst and promote carbon-nitrogen bond cleavage, specially at low H_2S partial pressure. When the H_2S partial pressure is greater than the nitrogen compound partial pressure an inhibiting effect of H_2S occurs and its promoting effect on carbon-nitrogen bond cleavage is cancelled. Hydrogen has a positive but moderate effect in hydrogenation steps. The mechanism of carbon-nitrogen bond scission depends

on the structure of the nitrogen molecule namely on the hybridization of the carbon atom bearing the nitrogen atom. If the carbon a with respect to the nitrogen is monosubstituted the mechanism is essentially a nucleophilic substitution. When the degree of substitution increases the elimination mechanism becomes more important and the two mechanisms are in competition. With a sulfided catalyst, H_2S from the gas phase doesn't change the importance of each mechanism, it just increases the rate of the reaction. In the presence of an oxide catalyst the contribution of the two mechanisms change. This result shows the importance of the sulphur species from the surface. The sites able to dissociate H_2S and H_2 are the same, and the dissociation is of heterolytic nature. The kinetic modeling of using the CHEMKIN/SURFACE CHEMKIN package seems to be a convenient method in order to understand the kinetic and mechanistic phenomena in hydrodenitrogenation. The preliminary simulations in the case of 2.6 diethylaniline showed that only one type of site is not sufficient to account for the experimental results. Further simulations will be necessary.

7903 (NUTEK-R–94-48) **Evaluation of instruments and incentives for limitation of carbon dioxide emissions in Sweden.** Swedish National Board for Industrial and Technical Development (NUTEK), Stockholm (Sweden). 1994. 32p. (In Swedish). Order Number DE95737687. Source: OSTI; NTIS.

The MARKAL model has been used to study how the CO2 emissions in Sweden are, and will be, affected by energy and emission taxes and by investment subsidies for renewable energy plants. For the period that these incentives have been in use, it is demonstrated that a CO2 reduction by 3-5 percent has been achieved. The tax increases of 1994 will lead to a further reduction of about 20 percent by year 2005. After 2005 a sharp increase of the emission is expected due to the planned onset of the nuclear power phaseout. 28 figs. 4 tabs

2950 Hydrogen and Synthetic Fuels

Refer also to citation(s) 8011, 8065

2960 Electric Power

Refer also to citation(s) 7860, 7863, 7913, 8018

7904 (ANL/DIS/TM–21) **APEX user's guide - (Argonne production, expansion, and exchange model for electrical systems), version 3.0.** VanKuiken, J.C. (and others); Veselka, T.D.; Guziel, K.A.; Blodgett, D.W.; Hamilton, S.; Kavicky, J.A.; Koritarov, V.S.; North, M.J.; Novickas, A.A.; Paprockas, K.R. Argonne National Lab., IL (United States). Nov 1994. 485p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. Order Number DE95006078. Source: OSTI; NTIS; (documentation only); ESTSC (complete software package), P.O. Box 1020, Oak Ridge, TN 37831-1020; GPO Dep.

This report describes operating procedures and background documentation for the Argonne Production, Expansion, and Exchange Model for Electrical Systems (APEX). This modeling system was developed to provide the U.S. Department of Energy, Division of Fossil Energy, Office of Coal and Electricity with in-house capabilities for addressing policy options that affect electrical utilities. To meet this objective, Argonne National Laboratory developed a menu-driven programming package that enables the user to develop and conduct simulations of production costs, system reliability, spot market network flows, and optimal system capacity expansion. The APEX system consists of three basic simulation components, supported by various databases and data management software. The components include (1) the investigation of Costs and Reliability in Utility Systems (ICARUS) model, (2) the Spot Market Network (SMN) model, and (3) the Production and Capacity Expansion (PACE) model. The ICARUS model provides generating-unit-level production-cost and reliability simulations with explicit recognition of planned and unplanned outages. The SMN model addresses optimal network flows with recognition of marginal costs, wheeling charges, and transmission constraints. The PACE model determines long-term (e.g., longer than 10 years) capacity expansion schedules on the basis of candidate expansion technologies and load growth estimates. In addition, the Automated Data Assembly Package (ADAP) and case management features simplify user-input requirements. The ADAP, ICARUS, and SMN modules are described in detail. The PACE module is expected to be addressed in a future publication.

7905 (DOE/EIA–0226(95/01)) **Electric power monthly: January 1995, with data for October 1994.** USDOE Energy Information Administration, Washington, DC (United States). Office of Coal, Nuclear, Electric and Alternate Fuels. Jan 1995. 203p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95005611. Source: OSTI; NTIS; GPO; GPO Dep.

The Electric Power Monthly (EPM) presents monthly electricity statistics for a wide audience including Congress, Federal and State agencies, the electric utility industry, and the general public. The purpose of this publication is to provide energy decision makers with accurate and timely information that may be used in forming various perspectives on electric issues that lie ahead. The EIA collected the information in this report to fulfill its data collection and dissemination responsibilities as specified in the Federal Energy Administration Act of 1974 (Public Law 93-275) as amended.

7906 (DOE/EIA–0437(93)/1) **Financial statistics of major U.S. investor-owned electric utilities 1993.** USDOE Energy Information Administration, Washington, DC (United States). Office of Coal, Nuclear, Electric and Alternate Fuels. Jan 1995. 623p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95005365. Source: OSTI; NTIS; GPO; GPO Dep.

The Financial Statistics of Major US Investor-Owned Electric Utilities publication presents summary and detailed financial accounting data on the investor-owned electric utilities. The objective of the publication is to provide Federal and State governments, industry, and the general public with current and historical data that can be used for policymaking and decisionmaking purposes related to investor-owned electric utility issues.

7907 (DOE/EIA–0540(93)) **Electric sales and revenue: 1993.** USDOE Energy Information Administration, Washington, DC (United States). Office of Coal, Nuclear, Electric and Alternate Fuels. Jan 1995. 230p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95005669. Source: OSTI; NTIS; GPO; GPO Dep.

The Electric Sales and Revenue is prepared by the Survey Management Division, Office of Coal, Nuclear, Electric and Alternate Fuels; Energy Information Administration (EIA); US Department of Energy. This publication provides information about sales of electricity, its associated revenue, and the average revenue per kilowatthour sold to residential, commercial, industrial, and other consumers throughout the United States. The sales, revenue, and average revenue per kilowatthour data provided in the Electric Sales and Revenue are based on annual data reported by electric utilities for the calendar year ending December 31, 1993. Operating revenue includes energy charges, demand charges, consumer service charges, environmental surcharges, fuel adjustments, and other miscellaneous charges. The revenue does not include taxes, such as sales and excise taxes, that are assessed on the consumer and collected through the utility. Average revenue per kilowatthour is defined as the cost per unit of electricity sold and is calculated by dividing retail sales into the associated electric revenue. Because electric rates vary based on energy usage, average revenue per kilowatthour are affected by changes in the volume of sales. The sales of electricity, associated revenue, and average revenue per kilowatthour data provided in this report are presented at the national, Census division, State, and electric utility levels.

7908 (DOE/EIA–0586) **Performance issues for a changing electric power industry.** USDOE Energy Information Administration, Washington, DC (United States). Office of Coal, Nuclear, Electric and Alternate Fuels. Jan 1995. 53p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95006183. Source: OSTI; NTIS; GPO; GPO Dep.

Extremely cold weather created record demands for electricity in the eastern two-thirds of the United States during the week of January 16, 1994. Fuel-related problems, mostly the result of transportation constraints resulting from ice accumulation on roads and water-ways, and unexpected generating capacity outages at utilities and nonutilities resulted in demand not being met. Some utilities

asked nonessential customers along with State governments and a portion of the Federal Government to shut down. Two electric control areas, the Pennsylvania-New Jersey-Maryland Interconnection (PJM) and Virginia Electric & Power Company (VEPCO), instituted rolling blackouts. This disturbance was reported widely in the press and, along with other disturbances, peaked renewed interest in the reliability of the electric power system. The renewed interest in reliability has coincided with substantial changes that are beginning to occur in the structure and competitiveness of the electric power industry. Juxtaposing the question of reliability and the issue of changing industry structure leads to the central concern of this report: What effect, if any, will the changing structure of the industry have on the reliability of the system?

7909 (DOE/ER–0638) **Positioning the electric utility to build information infrastructure.** USDOE Office of Energy Research, Washington, DC (United States). Office of Scientific Computing. Nov 1994. 38p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95006366. Source: OSTI; NTIS; GPO Dep.

In two particular respects (briefly investigated in this study from a lawyer's perspective), electric utilities appear uniquely well-positioned to contribute to the National Information Infrastructure (NII). First of all, utilities have legal powers derived from their charters and operating authorities, confirmed in their rights-of-way, to carry out activities and functions necessary for delivering electric service. These activities and functions include building telecommunications facilities and undertaking information services that have become essential to managing electricity demand and supply. The economic value of the efficiencies made possible by telecommunications and information could be substantial. How great remains to be established, but by many estimates electric utility applications could fund a significant share of the capital costs of building the NII. Though utilities' legal powers to pursue such efficiencies through telecommunications and information appear beyond dispute, it is likely that the effort to do so will produce substantial excess capacity. Who will benefit from this excess capacity is a potentially contentious political question that demands early resolution. Will this windfall go to the utility, the customer, or no one (because of political paralysis), or will there be some equitable and practical split? A second aspect of inquiry here points to another contemporary issue of very great societal importance that could very well become the platform on which the first question can be resolved fortuitously-how to achieve universal telecommunications service. In the effort to fashion the NII that will now continue, ways and means to maximize the unique potential contribution of electric utilities to meeting important social and economic needs–in particular, universal service–merit priority attention.

7910 (ETDE-DE–2) **Bayernwerk AG und -Konzern. Report on the 72nd business year from October 1, 1991 to September 30, 1992.** Bayernwerk AG, Muenchen (Germany). [1993]. 89p. (In German). Order Number DE95737795. Source: OSTI; NTIS (US Sales Only).

The tasks and activities of the German supraregional electric utility are described and numerous financial data (balance, statement of revenue and expenditure) is given in this annual report 1991/92. The Bayernwerk AG is responsible for supraregional power supply in Bavaria. It supplies regional and large municipal utility companies with electric energy. Apart from this it supplies some large consumers, the chemical industry, and the Deutsche Bundesbahn. The society sets up and operates plants for the production and distribution of electric energy and is responsible for interconnected operation in Bavaria, with other Federal and with neighbouring states. (orig.)

7911 (KTM/E-A–5) **The demand for electricity is growing but what about the production?.** Ministry of Trade and Industry, Helsinki (Finland). Energy Dept. 1994. 26p. (In Finnish). Order Number DE95737599. Source: OSTI; NTIS.

The medium-term economic outlook for Finland is assessed to be relatively good. Export industries have been raising their output already for a couple of years, and in the industries typically supplying the domestic market, too, a revival is expected to take place. The growth of output in the export industries largely explains why the demand for electricity went on increasing still in the early 1990s, despite the recession. During the latter half of the nineties, the outlook for electricity demand will decisively depend on the extent to which industries are able to invest over the next two or three years. The outlook is also connected with the success in the market penetration of new, energy efficient appliances and technologies. Supposing that investments will realize as foreseen by the economic policy and economic forecasts and that other sectors soon follow the example of export industries, the consumption of electricity would have to rise from this year's about 69 TWh to around 85 TWh in the year 2000 and perhaps to 96 TWh by the year 2005. Finland's existing capacity combined with that under construction will not satisfy such increase in the demand. The additional capacity needed under the expected conditions of the year 2000, which call for decisions to compensate the termination of the electricity import contract in force, would be about 2000 MW in that year and rise, by the year 2005, to no less than 4000 MW. The new capacity is anyhow likely to be provided through a combination of new power plants burning fossile or indigenous fuels and of electricity imports. This means, among other things, that the level of CO_2 emissions from power plants will rise markedly over the next ten years.

7912 (ORNL/TM–12855) **Progress in the standardization of DSM terminology, reporting formats, and evaluation protocols.** Berry, L. Oak Ridge National Lab., TN (United States). Oct 1994. 47p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE95004792. Source: OSTI; NTIS; GPO Dep.

Evaluations of demand-side management programs are numerous and serve many purposes: assessing effectiveness, promoting program improvements, guiding planning processes, and determining the level of shareholder incentives. Although many program evaluations are available, it is difficult to combine or compare results because of inconsistencies in definitions, reporting formats, and evaluation methods. The increased use of explicit and standardized definitions of terms, consistent data reporting formats, and comparable methods is needed to make combining and comparing results across a range of programs, utilities, and state jurisdictional boundaries possible. Producing consistent and accurate comparisons of program experience is an important, although challenging and, therefore, under utilized, means of identifying the key elements of effective programs and of improving future programs. In spite of the importance of arriving at standard terminology and data reporting conventions, progress is slow. The purpose of this report is to assess progress toward standardization by reviewing attempts to promote standardization and by determining the degree of consistency in various sources. There are a number of efforts to promote standardization including regional utility efforts such as Northeast Regional DSM Data Exchange and NU-Trak in the Pacific Northwest, state regulatory commission requirements, and Lawrence Berkeley Laboratory and Oak Ridge National Laboratory databases and publications, which are national in scope. A variety of other organizations such as the Association of Demand-Side Management Professionals, the Electric Power Research Institute, the National Association of Regulatory Utility Commissioners, the Energy Information Administration, the Synergic Resources Corporation, the Environmental Protection Agency, and the National Association of Energy Service Companies have publications and/or training courses designed to promote greater standardization.

2980 Consumption and Utilization

Refer also to citation(s) 7907, 8018

7913 (DOE/EIA–0035(95/01)) **Monthly energy review: January 1995.** USDOE Energy Information Administration, Washington, DC (United States). Office of Energy Markets and End Use. Jan 1995. 176p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95005791. Source: OSTI; NTIS; GPO; GPO Dep.

Two major industry groups–the chemicals and allied products industry and the petroleum and coal products industry–accounted for more than half of US 1991 manufacturing primary energy consumption, which totaled 20.3 quadrillion Btu. Those two groups and four others (paper and allied products; primary metals; food and

kindred products; and stone, clay, and glass products) accounted for 88 percent of the 1991 total. Those are among the results of the 1991 Manufacturing Energy Consumption Survey (MECS), which is one of four major energy end-use surveys conducted by the Energy Information Administration (EIA) and the only comprehensive source of national-level data on US manufacturing energy use. The 1991 MECS is the third in an ongoing series of surveys conducted at 3-year intervals through 1994.

2990 Unconventional Sources and Power Generation

Refer also to citation(s) 7539, 7574, 7868, 7886

7914 (CONF-9411177–Absts., [pp. n]) **Energy conversion research at the PSI: combustion, fuels from biomass, solar energy.** Kesselring, P. (Paul Scherrer Inst. (PSI), Villigen (Switzerland)). Paul Scherrer Inst. (PSI), Villigen (Switzerland). 1994. [36p.] From Energy days 94; Villigen (Switzerland); 10-11 Nov 1994. In *Programme and book of abstracts.* Order Number DE95743548. Source: OSTI; NTIS.

Short communication ENERGY CONVERSION/research programs; SWITZERLAND/research programs; SWITZERLAND; CATALYTIC COMBUSTORS; LASERS; SOLAR CELLS; SOLAR PROCESS HEAT; NUMERICAL DATA; DIAGNOSTIC TECHNIQUES

30 DIRECT ENERGY CONVERSION

3003 Thermoelectric Generators

Refer also to citation(s) 7680

3005 Fuel Cells

Refer also to citation(s) 8060, 8061

7915 (ANL/CMT/CP–83639) **Advances in research for solid oxide fuel cells.** Krumpelt, M. (Argonne National Lab., IL (United States). Electrochemical Technology Program); Kueper, T.W.; Doshi, R. Argonne National Lab., IL (United States). [1994]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-940883–8: Fuel cells '94, Morgantown, WV (United States), 17-19 Aug 1994). Order Number DE95004590. Source: OSTI; NTIS; GPO Dep.

Solid oxide fuel cells are attracting considerable interest among industrial organizations wanting to position themselves in a potentially important technology of the future. More than a dozen new organizations worldwide have begun SOFC development in the last few years. Most of this R and D activity is in the planar technology, because it represents a good compromise between the proven but IR-limited tubular configuration and the high-performance but difficult-to-fabricate monolithic structure. The challenges of developing the planar cell configurations are finding high-temperature edge and manifold seal materials that will make very flat ceramic trilayers of sufficiently large area, and minimize contact resistances in stacks of cells. Also, decreasing the operating temperature requires development of reliable thin-film fabrication methods for the electrolyte, and finding a metal with good oxidation resistance and a thermal expansion coefficient well matched with the different cell components. Finally, toughness and a thermal stress tolerance of stacks need to be improved.

7916 (DOE/MC/26006–3824) **Monolithic solid oxide fuel cell technology advancement for coal-based power generation. Final report, September 1989–March 1994.** Allied-Signal Aerospace Co., Torrance, CA (United States). May 1994. 377p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC21-89MC26006. Order Number DE94012258. Source: OSTI; NTIS; GPO Dep.

This project has successfully advanced the technology for MSOFCs for coal-based power generation. Major advances include: tape-calendering processing technology, leading to 3X improved performance at 1000 C; stack materials formulations and designs with sufficiently close thermal expansion match for no stack damage after repeated thermal cycling in air; electrically conducting bonding with excellent structural robustness; and sealants that form good mechanical seals for forming manifold structures. A stack testing facility was built for high-spower MSOFC stacks. Comprehensive models were developed for fuel cell performance and for analyzing structural stresses in multicell stacks and electrical resistance of various stack configurations. Mechanical and chemical compatibility properties of fuel cell components were measured; they show that the baseline Ca-, Co-doped interconnect expands and weakens in hydrogen fuel. This and the failure to develop adequate sealants were the reason for performance shortfalls in large stacks. Small (1-in. footprint) two-cell stacks were fabricated which achieved good performance (average area-specific-resistance 1.0 ohm-cm^2 per cell); however, larger stacks had stress-induced structural defects causing poor performance.

7917 (DOE/MC/26006–3960) **Monolithic solid oxide fuel cell technology advancement for coal-based power generation. Quarterly technical progress report, January–March 1994.** Department of Energy, Morgantown, WV (United States). Morgantown Energy Technology Center. 25 Oct 1994. 28p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC21-89MC26006. Order Number DE95006152. Source: OSTI; NTIS; GPO Dep.

Objective is to advance materials and fabrication methods to develop a monolithic solid oxide fuel cell (MSOFC) system for coal-based power generation. Focus is on materials R and D, fabrication process development, cell/stack performance testing and characterization, cost and system analysis, and quality development.

7918 (DOE/METC–94/1010, pp. 3-8) **Tubular Solid Oxide Fuel Cell Development Program.** Ray, E.R. (Westinghouse Electric Corp., Pittsburgh, PA (United States)). USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States); USDOE Morgantown Energy Technology Center, WV (United States). Aug 1994. DOE Contract FC21-91MC28055. (CONF-940883–: Fuel cells '94, Morgantown, WV (United States), 17-19 Aug 1994). In *Proceedings of the fuel cells '94 contractors review meeting.* 191p. Order Number DE94012285. Source: OSTI; NTIS; GPO Dep.

This paper presents an overview of the Westinghouse Solid Oxide Fuel Cell (SOFC) development activities and current program status. Our goal is to develop a cell that can operate for 50,000 to 100,000 hours. Progress toward this goal will be discussed and test results presented for multiple single cell tests which have now successfully exceeded 48,000 hours of continuous power operation at temperature. Curves are presented which demonstrate the improved cell performance and life obtained to date.

7919 (DOE/METC–94/1010, pp. 9-14) **Tubular solid oxide fuel cell demonstration activities.** Veyo, S.E. (Westinghouse Electric Corp., Pittsburgh, PA (United States)). USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States); USDOE Morgantown Energy Technology Center, WV (United States). Aug 1994. DOE Contract FC21-91MC28055. (CONF-940883–: Fuel cells '94, Morgantown, WV (United States), 17-19 Aug 1994). In *Proceedings of the fuel cells '94 contractors review meeting.* 191p. Order Number DE94012285. Source: OSTI; NTIS; GPO Dep.

The development of a viable fuel cell electrical power generation system involves not only the development of cell and stack technology, but also the development of the overall system concept, the strategy for control, and the ancillary subsystems. The design requirements used to guide system development must reflect a customer focus in order to evolve a commercial product. In order to obtain useful customer feedback, Westinghouse has practiced the deployment with customers of fully integrated, automatically controlled, packaged solid oxide fuel cell power generation systems. These field units have served to demonstrate to customers first hand the beneficial attributes of the SOFC, to expose deficiencies through experience in order to guide continued development, and to garner real world feedback and data concerning not only cell and stack parameters, but also transportation, installation, permitting and licensing, start-up and shutdown, system alarming, fault detection, fault response, and operator interaction.

7920 (DOE/METC–94/1010, pp. 15-18) **Solid oxide fuel cells material research.** Stevenson, J. (Pacific Northwest Lab., Richland, WA (United States)); Pederson, L.; Coffey, G. USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States); USDOE Morgantown Energy Technology Center, WV (United States). Aug 1994. (CONF-940883–: Fuel cells '94, Morgantown, WV (United States), 17-19 Aug 1994). In *Proceedings of the fuel cells '94 contractors review meeting.* 191p. Order Number DE94012285. Source: OSTI; NTIS; GPO Dep.

Protonic conductivity in the strontium ytterbium cerates was shown to have a large grain boundary component. Protonic conductivity in these materials requires the presence of water, which reacts with oxygen vacancies to yield hydroxyl groups that support proton conduction. Transference numbers were determined for protons, oxygen ions, and electrons as a function of temperature. Protonic conduction dominated in hydrated cerates up to 450°C. At higher temperatures, oxygen ion and electronic conductivity became progressively more important. Hydrogen could be pumped across the cerate membrane by applying a dc voltage. At 800°C, pure hydrogen fluxes greater than 1 sccm/cm^2 could be driven across the membrane.

7921 (DOE/METC–94/1010, pp. 19-21) **Advances in research for solid oxide fuel cells.** Krumpelt, M. (Argonne National Lab., IL (United States)); Kueper, T.; Doshi, R. USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States); USDOE Morgantown Energy Technology Center, WV (United States). Aug 1994. (CONF-940883–: Fuel cells '94, Morgantown, WV (United States), 17-19 Aug 1994). In *Proceedings of the fuel cells '94 contractors review meeting.* 191p. Order Number DE94012285. Source: OSTI; NTIS; GPO Dep.

Solid oxide fuel cells are attracting considerable interest among industrial organizations wanting to position themselves in a potentially important technology of the future. More than a dozen new organizations worldwide have begun SOFC development in the last few years.

7922 (DOE/METC–94/1010, pp. 25-32) **Alternative materials for solid oxide fuel cells.** Armstrong, T.R. (Pacific Northwest Lab., Richland, WA (United States)); Stevenson, J.W. USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States); USDOE Morgantown Energy Technology Center, WV (United States). Aug 1994. (CONF-940883–: Fuel cells '94, Morgantown, WV (United States), 17-19 Aug 1994). In *Proceedings of the fuel cells '94 contractors review meeting.* 191p. Order Number DE94012285. Source: OSTI; NTIS; GPO Dep.

The purpose of this research is to develop alternate materials for solid oxide fuel cell (SOFC) interconnections and electrodes with improved electrical, thermal, and electrochemical properties. A second objective is to develop synthesis and fabrication methods for these materials whereby they can be processed in air into SOFCs. The approach is to (1) develop modifications of the current, state-of-the-art materials used in SOFCs, (2) minimize the number of cations used in the SOFC materials to reduce potential deleterious interactions, (3) improve thermal, electrical, and electrochemical properties, (4) develop methods to synthesize both state-of-the-art and alternative materials for the simultaneous fabrication and consolidation in air of the interconnections and electrodes with the solid electrolyte, and (5) understand electrochemical reactions at materials interfaces and the effects of component composition and processing on those reactions.

7923 (DOE/METC–94/1010, pp. 33-37) **Support research for solid oxide fuel cells.** Krumpelt, M. (Argonne National Lab., IL (United States)); Kueper, T.W. USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States); USDOE Morgantown Energy Technology Center, WV (United States). Aug 1994. (CONF-940883–: Fuel cells '94, Morgantown, WV (United States), 17-19 Aug 1994). In *Proceedings of the fuel cells '94 contractors review meeting.* 191p. Order Number DE94012285. Source: OSTI; NTIS; GPO Dep.

The purpose of this work is to develop technology for a planar solid oxide fuel cell (SOFC) which uses a thin electrolyte and operates at about 800°C. The two major tasks of this effort are: (1) develop a conductive bond layer between the electrodes and the interconnect and (2) integrate a metallic interconnect into the stack which is well matched with the other cell components with regard to thermal expansion and is adequately protected from corrosion.

7924 (DOE/METC–94/1010, pp. 38-40) **Multiply manifolded molten carbonate fuel cells.** Krumpelt, M. (Argonne National Lab., IL (United States)); Roche, M.F.; Geyer, H.K.; Johnson, S.A. USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States); USDOE Morgantown Energy Technology Center, WV (United States). Aug 1994. (CONF-940883–: Fuel cells '94, Morgantown, WV (United States), 17-19 Aug 1994). In *Proceedings of the fuel cells '94 contractors review meeting.* 191p. Order Number DE94012285. Source: OSTI; NTIS; GPO Dep.

This study consists of research and development activities related to the concept of a molten carbonate fuel cell (MCFC) with multiple manifolds. The objective is to develop an MCFC having a higher power density and a longer life than other MCFC designs. The higher power density will result from thinner gas flow channels; the extended life will result from reduced temperature gradients. Simplification of the gas flow channels and current collectors may also significantly reduce cost for the multiply manifolded MCFC.

7925 (DOE/METC–94/1010, pp. 41-42) **Lithium ferrate and lithium cobaltate cathodes for molten carbonate fuel cells.** Krumpelt, M. (Argonne National Lab., IL (United States)); Roche, M.F.; Bloom, I.D.; Indacochea, J.E.; Kucera, G.H. USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States); USDOE Morgantown Energy Technology Center, WV (United States). Aug 1994. DOE Contract W-31109-ENG-38. (CONF-940883–: Fuel cells '94, Morgantown, WV (United States), 17-19 Aug 1994). In *Proceedings of the fuel cells '94 contractors review meeting.* 191p. Order Number DE94012285. Source: OSTI; NTIS; GPO Dep.

The objective of this research is to develop cathodes for the molten carbonate fuel cell (MCFC) having a performance approaching that of the lithiated nickel oxide cathode and a significantly greater life, particularly in pressurized MCFCs. To meet this objective, cathodes containing either doubly doped lithium ferrate or lithium cobaltate are being developed.

7926 (DOE/METC–94/1010, pp. 43-48) **Carbonate fuel cell analysis.** Bernard, R. (Energy Research Corp., Danbury, CT (United States)); Hunt, J.; Paetsch, L.; Skok, A.; Yuh, C. USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States); USDOE Morgantown Energy Technology Center, WV (United States). Aug 1994. DOE Contract AC21-93MC30054. (CONF-940883–: Fuel cells '94, Morgantown, WV (United States), 17-19 Aug 1994). In *Proceedings of the fuel cells '94 contractors review meeting.* 191p. Order Number DE94012285. Source: OSTI; NTIS; GPO Dep.

Power plant system studies indicate that carbonate fuel cell systems have the potential of offering high efficiency, competitive cost and environmentally superior power plants operating on coal. The overall objective of the project was to demonstrate carbonate fuel cell compatibility with coal-derived gases; the specific objective of this project was to assess the possible effect of contaminants on the performance and life of a carbonate fuel cell. The approach taken was to test a 20kW fuel cell stack using actual coal-gas, to monitor its performance relative to a standard and to perform a detailed post-test analysis of the stack to determine long term operating issue(s), if any.

7927 (DOE/METC–94/1010, pp. 49-50) **Molten carbonate fuel cell with high power density.** Krumpelt, M. (Argonne National Lab., IL (United States)); Roche, M.F.; Bloom, I.D.; Geyer, H.K.; Johnson, S.A. USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States); USDOE Morgantown Energy Technology Center, WV (United States). Aug 1994. DOE Contract W-31109-ENG-38. (CONF-940883–: Fuel cells '94, Morgantown, WV (United States), 17-19 Aug 1994). In *Proceedings of the fuel cells '94 contractors review meeting.* 191p. Order Number DE94012285. Source: OSTI; NTIS; GPO Dep.

The objective of this research is a doubling of the current density of the molten carbonate fuel cell (MCFC) from the present value of 1600 A/m^2 to 3200 A/m^2 and a similar increase in the volumetric power density.

7928 (DOE/METC–94/1010, pp. 51-52) **Pitting corrosion of aluminized seals in molten carbonate fuel cells.** Krumpelt, M. (Argonne National Lab., IL (United States)); Roche, M.F.; Bloom, I.D. USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States); USDOE Morgantown Energy Technology Center, WV (United States). Aug 1994. DOE Contract W-31109-ENG-38. (CONF-940883–: Fuel cells '94, Morgantown, WV (United States), 17-19 Aug 1994). In *Proceedings of the fuel cells '94 contractors review meeting.* 191p. Order Number DE94012285. Source: OSTI; NTIS; GPO Dep.

The objective of this research is to gain a better understanding of the corrosion of the aluminized Type 316 stainless steel (SS) employed in the seal areas of the molten carbonate fuel cell (MCFC). The seals are formed between the aluminized Type 316 SS surface and the electrolyte (generally a mixture of molten alkali carbonates and lithium aluminate). These "wet" seals are used at the periphery of the MCFC and around the gas manifolds that deliver fuel and oxidant to the anode and cathode of the MCFC. They contain the anode and cathode gases within the MCFC. Of particular interest in this study is measurement of the pitting corrosion of the aluminized Type 316 SS in the seal areas of the MCFC.

7929 (DOE/METC–94/1010, pp. 53-65) **Processing of $LaCrO_3$ for solid oxide fuel cell applications.** Huebner, W. (Univ. of Missouri, Rolla, MO (United States)); Anderson, H.U. USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States); USDOE Morgantown Energy Technology Center, WV (United States). Aug 1994. DOE Contract FG21-93MC29224. (CONF-940883–: Fuel cells '94, Morgantown, WV (United States), 17-19 Aug 1994). In *Proceedings of the fuel cells '94 contractors review meeting.* 191p. Order Number DE94012285. Source: OSTI; NTIS; GPO Dep.

The University of Missouri-Rolla is performing a 5 year research program dedicated towards the development of $LaCrO_3$-based interconnect powders which densify when in contact with anode and cathode materials for solid oxide fuel cells (SOFC). During a previous DOE-METC Program (DE-FG21-89MC26015) we developed and characterized potential cathode and interconnect materials. During the course of this program we investigated compositions within the pseudo-ternary $LaCrO_3$-$LaMnO_3$-$LaCoO_3$ system. Results indicated that some of the compositions in this system exhibited the requisite electrical conductivity and stability towards reduction, and could be sintered in air at temperatures less than 1450°C.

7930 (DOE/METC–94/1010, pp. 66-71) **Sealant materials for the solid oxide fuel cell.** Krumpelt, M. (Argonne National Lab., IL (United States)); Kumar, R.; Bloom, I.; Ley, K.L. USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States); USDOE Morgantown Energy Technology Center, WV (United States). Aug 1994. DOE Contract W-31109-ENG-38. (CONF-940883–: Fuel cells '94, Morgantown, WV (United States), 17-19 Aug 1994). In *Proceedings of the fuel cells '94 contractors review meeting.* 191p. Order Number DE94012285. Source: OSTI; NTIS; GPO Dep.

The objective of this work is to develop sealing materials for solid oxide fuel cells (SOFCs). A suitable sealant must form strong, dense bonds with SOFC components, be chemically stable and mechanically compatible with the components at the operating temperature and over the temperature range of interest, be chemically stable in the operating environment of the SOFC (i.e., H_2 and H_2O on the anode side, O_2 on the cathode side), and must be electronically insulating.

7931 (DOE/METC–94/1010, pp. 72) **Trace species removal for fuel cell application.** Pigeaud, A. (Energy Research Corp., Danbury, CT (United States)); Gelb, A. USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States); USDOE Morgantown Energy Technology Center, WV (United States). Aug 1994. (CONF-940883–: Fuel cells '94, Morgantown, WV (United States), 17-19 Aug 1994). In *Proceedings of the fuel cells '94 contractors review meeting.* 191p. Order Number DE94012285. Source: OSTI; NTIS; GPO Dep.

The development of advanced, potentially very clean, coal-fired energy conversion requires integration with reliable and efficient, cleanup systems which can remove almost all gaseous contaminants and metallic vapor species from high-temperature, high-pressure gas streams down to sub-ppm concentration levels. In the thermal as well as electrochemical conversion systems, the removal of polluting trace elements to very low levels is becoming a mandatory necessity both in terms of the decay that contaminants such as: HCl, metal sulfides, arsine, alkali, metals, zinc, cadmium, lead and mercury vapors, can have on energy conversion equipment, and that can also seriously affect the environment if emitted into the atmosphere. The objective of current work at ERC has therefore been to develop a novel, high temperature polishing concept using a liquid-metal-alloy "getter" for scrubbing hot coal-derived fuels. A patent has been applied for this invention which basically proposes to scrub hot reducing gases with a reactive liquid metal alloy by pumping it at elevated temperatures over a high efficiency, gas/liquid-film, contacting device in countercurrent fashion. This is to remove a number of contaminants and hazardous air pollutants (or HAP's) from hot fuel gas containing very low levels. Results from equilibrium thermogravimetric analysis are quite promising with respect to arsenic and a number of other metallic species. Reactor design for the scrubber has been completed and is currently being fabricated.

7932 (DOE/METC–94/1010, pp. 73-79) **Macrocyclic redox promoters for direct methanol fuel cells.** Sarangapani, S. (ICET, Inc., Norwood, MA (United States)); Sarangapani, S.; Morriseau, B. USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States); USDOE Morgantown Energy Technology Center, WV (United States). Aug 1994. DOE Contract FG02-91ER81186. (CONF-940883–: Fuel cells '94, Morgantown, WV (United States), 17-19 Aug 1994). In *Proceedings of the fuel cells '94 contractors review meeting.* 191p. Order Number DE94012285. Source: OSTI; NTIS; GPO Dep.

Direct methanol fuel cell (DMFC) powered vehicles are foreseen as the choice of the future, because of its environmentally benign combustion products, potential for high efficiency and above all for its unlimited supply within United States. The major obstacle in the development of methanol fuel cell is the methanol electrode, particularly, a catalyst for the oxidation of methanol. No stable and active catalysts exist that can oxidize methanol for long periods of time without the loss of efficiency. Our research has identified certain transition metal macrocyclic complexes as promoters for Pt during methanol oxidation. Half-cell studies of some of these promoters show 100-150 mV improvement over the control at 8 times less platinum loading compared to the control. These results were reported in the last DOE Joint Contractors Meeting. We now present an update of these results, together with the results of full cells employing our catalyst promoters.

7933 (DOE/METC–94/1010, pp. 80-87) **Perovskite solid electrolytes for SOFC.** Sammells, A.F. (Eltron Research, Inc., Boulder, CO (United States)). USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States); USDOE Morgantown Energy Technology Center, WV (United States). Aug 1994. DOE Contract FG02-90ER80910. (CONF-940883–: Fuel cells '94, Morgantown, WV (United States), 17-19 Aug 1994). In *Proceedings of the fuel cells '94 contractors review meeting.* 191p. Order Number DE94012285. Source: OSTI; NTIS; GPO Dep.

The objective of this program is to experimentally determine the utility of selected perovskite related solid electrolytes for application in SOFC's operating at intermediate temperatures (600-750°C). Specific technical objectives addressed in this program include: Gaining useful insight into those crystallographic and thermodynamic parameters which influence both activation energy (E_a) for ionic transport and the population of ionic charge carriers, synthesizing selected perovskite related solid electrolyte powders expected to possess (i) low E_a for ionic conduction and (ii) an intrinsically high population of ionic charge carriers, preparing sintered solid electrolyte disks and determine their ionic conductivity, incorporating solid electrolytes demonstrating acceptable ionic conductivity into small research size SOFC's operating at intermediate temperatures and determine their electrochemical performance, and determining the long-term stability of selected solid electrolyte materials incorporated into SOFC's.

7934 (DOE/METC–94/1010, pp. 88-92) **A practical method of hydrogen purification for use in fuel-cell systems.** Edlund, D.J. (Bend Research, Inc., Bend, OR (United States)). USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States); USDOE Morgantown Energy Technology Center, WV (United States). Aug 1994. DOE Contract FG03-91ER81229 ; FG03-91ER81228 ; FG03-92ER81419. (CONF-940883–: Fuel cells '94, Morgantown, WV (United States), 17-19 Aug 1994). In *Proceedings of the fuel cells '94 contractors review meeting.* 191p. Order Number DE94012285. Source: OSTI; NTIS; GPO Dep.

These programs are directed at the development of a practical and economical composite-metal membrane for use in high-temperature hydrogen-separation/purification processes. One potential application of this technology is for the purification of hydrogen, made by hydrocarbon reforming or partial oxidation reactions, for use in fuel cells to produce electricity. Although this applications falls outside the scope of the referenced SBIR contracts, the technology has advanced under these programs to the point where initial feasibility tests have been conducted by Ballard Power Systems using a high-pressure methanol/steam reformer are shown. The general features of an integrated fuel-cell system in which hydrogen is produced in a hydrocarbon reformer, purified, and then fed to the fuel cells. Generally speaking, the hydrogen-purification method should meet the following requirements: produce high-purity hydrogen; be compact in size and weight; have low parasitic power requirements; exhibit rapid load-following capability; and be affordable. The metal-membrane technology under development at Bend Research has the potential to meet these requirements.

7935 (DOE/METC–94/1010, pp. 93-102) **Investigation of wetting phenomena and oxidation/lithiation behavior of nickel in molten carbonate.** Selman, J.R. (Illinois Institute of Technology, Chicago, IL (United States)). USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States); USDOE Morgantown Energy Technology Center, WV (United States). Aug 1994. DOE Contract AC21-90MC27394. (CONF-940883–: Fuel cells '94, Morgantown, WV (United States), 17-19 Aug 1994). In *Proceedings of the fuel cells '94 contractors review meeting.* 191p. Order Number DE94012285. Source: OSTI; NTIS; GPO Dep.

Performance improvement and quantitative understanding of the long-term performance decay which may take place in MCFC stacks are the key points for the success of molten carbonate fuel cells (MCFC) for the coming century. By considering these points: (1) Meniscus formation on metal electrodes in molten carbonate is investigated. The objective is to clarify the phenomena in the boundary region among electrode, gas and molten carbonate under cathode gas conditions. (2) Oxidation of nickel foil in-situ under an oxidant atmosphere is relevant for an understanding of the in-situ oxidation process to which nickel sinters are subjected in some MCFC stacks. The potential of the nickel foil is monitored while the oxidation and partial dissolution of the foil is followed optically and recorded on videotape. Additionally, the cathodic dissolution and the particle behavior are discussed to understand and quantify the conditions that may lead to high ohmic shorting of MCFC.

7936 (DOE/METC–94/1010, pp. 113-117) **MCFC development for logistic fuel applications.** Patel, P. (Energy Research Corp., Danbury, CT (United States)); Piwetz, M.; Steinfeld, G. USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States); USDOE Morgantown Energy Technology Center, WV (United States). Aug 1994. Contract NAS3-27021. (CONF-940883–: Fuel cells '94, Morgantown, WV (United States), 17-19 Aug 1994). In *Proceedings of the fuel cells '94 contractors review meeting.* 191p. Order Number DE94012285. Source: OSTI; NTIS; GPO Dep.

Energy Research Corporation (ERC) is conducting a program for the development of fuel cell power plants for fixed and bare-base DoD applications under the ARPA "Fuel Cell Power Plant Initiative." ERC will adapt its direct carbonate fuel cell power plant technology in combination with a logistic fuel processing system for this dual use power plant application. This development is expected to improve the efficiency, fuel flexibility, emissions, and thermal and acoustic signatures of future fixed-base and mobile power plants. Bare-base power systems are required to rapidly establish a sustainable operation at a location vital to various military missions. These power systems may be used globally, in all seasonal environments, and in any of the climate extremes listed in MIL-STD-210B. The power systems must be rugged, portable, reliable, affordable, and simple to maintain.

7937 (DOE/METC–94/1010, pp. 118-119) **SOFC development for logistics fuel applications.** Veyo, S.E. (Westinghouse Electric Corp., Orlando, FL (United States)); Piwetz, M.M.; Moss, W.E. USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States); USDOE Morgantown Energy Technology Center, WV (United States). Aug 1994. Contract NAS3-27022. (CONF-940883–: Fuel cells '94, Morgantown, WV (United States), 17-19 Aug 1994). In *Proceedings of the fuel cells '94 contractors review meeting.* 191p. Order Number DE94012285. Source: OSTI; NTIS; GPO Dep.

Westinghouse has undertaken a two year project under sponsorship of the Advanced Research Projects Agency (ARPA) to develop and demonstrate the technology enabling use of logistics fuels, diesel fuel (DF-2) and jet turbine fuel (JP-8), in Solid Oxide Fuel Cell (SOFC) Power Systems for fixed military bases and bare base deployment. The project is administered by the National Aeronautics and Space Administration (NASA). The project team includes as major subcontractors Haldor Topsoe, Inc. (HTI) and Southern California Edison (SCE). The project will culminate in the demonstration at SCE's Highgrove Fuel Cell Test Center of an SOFC power plant fueled by logistics fuels. The SOFC generator module (stack) will employ the air electrode supported (AES) tubular SOFC developed by Westinghouse under a cooperative agreement with the Department of Energy (DOE), Morgantown Energy Technology Center (METC). The AES-SOFC stack will have a maximum output of 30 kWe. The Logistics Fuel Processor (LFP) is under development by Haldor Topsoe, Inc. and will provide a sulfur free, methane rich fuel stream to the SOFC. HTI will construct a brass-board LFP as a non-integrated subsystem that will be coupled to an SOFC system now in place at the SCE site. Prior to the SOFC/LFP demonstration, the fuel cell stack presently in use at the SCE site will be replaced with a new one employing the AES-SOFC. SCE will install and operate the SOFC/LFP system.

7938 (DOE/METC–94/1010, pp. 123-130) **Update: Commercialization of the direct fuel cell.** Baker, B.S. (Energy Research Corp., Danbury, CT (United States)); Bentley, C.R.; Glenn, D.R. USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States); USDOE Morgantown Energy Technology Center, WV (United States). Aug 1994. (CONF-940883–: Fuel cells '94, Morgantown, WV (United States), 17-19 Aug 1994). In *Proceedings of the fuel cells '94 contractors review meeting.* 191p. Order Number DE94012285. Source: OSTI; NTIS; GPO Dep.

The commercialization of the Direct Fuel Cell (DFC), ERC's trade name for its internal reforming carbonate fuel cell technology, moved into an important phase this past year. Activities were characterized by extensive testing both at ERC and user sites. The next period requires a continuation of a product improvement program to further refine all aspects of the stack, module and plant system, while concurrently affecting the transition from a technology-driven effort to a full scale prototype power plant hardware demonstration.

7939 (DOE/METC–94/1010, pp. 131-134) **Overview of MCFC commercialization strategy.** Laurens, R.M. (M-C Power Corp., Burr Ridge, IL (United States)); Petraglia, V.J. USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States); USDOE Morgantown Energy Technology Center, WV (United States). Aug 1994. DOE Contract AC21-90MC27394. (CONF-940883–: Fuel cells '94, Morgantown, WV (United States), 17-19 Aug 1994). In *Proceedings of the fuel cells '94 contractors review meeting.* 191p. Order Number DE94012285. Source: OSTI; NTIS; GPO Dep.

M-C Power Corporation (MCP) was founded in 1987 with the sole purpose of commercializing the IMHEX® molten carbonate fuel cell (MCFC), invented by the Institute of Gas Technology (IGT). IMHEX uses internal manifolding to distribute both anode and cathode fuel and exhaust gases. The design is similar to that used in commercial flat plate, internally manifolded heat exchangers, hence the name IMHEX. Like its commercial counterpart, this

design allows the use of a single vertical force to maintain all manifold and edge-of-stack seals while simultaneously maintaining electrical cell-to-cell continuity. The design has been successfully operated with 11-square foot commercial size cells in 20-cell short stacks. Full commercial height stacks of 250 cells will be tested at Unocal later this year and in San Diego mid next year. M-C Power's commercialization plan encompasses five key strategies: Achieve development program goals, Establish strategic alliances with other firms, Secure contingent orders for our market-entry units, Construct new manufacturing facility to meet future production growth, and Reduce product costs for both market-entry and future production.

7940 (DOE/METC–94/1010, pp. 135-137) **The alliance to commercialize carbonate technology: A revitalized industry commitment to IMHEX® fuel cell commercialization.** Nimmons, J.T. USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States); USDOE Morgantown Energy Technology Center, WV (United States). Aug 1994. (CONF-940883–: Fuel cells '94, Morgantown, WV (United States), 17-19 Aug 1994). In *Proceedings of the fuel cells '94 contractors review meeting.* 191p. Order Number DE94012285. Source: OSTI; NTIS; GPO Dep.

The Alliance to Commercialize Carbonate Technology, or ACCT, is a key element in the commercialization strategy for IMHEX molten carbonate fuel cell (MCFC) technology. It is a working alliance among prospective buyers and users of MCFC's, and between those organizations and the team that is designing and developing, and will manufacture and distribute, IMHEX power plants. ACCT organizations include privately- and publicly-owned electric, gas, combination, and other utilities, natural gas pipelines, independent power producers, institutional and industrial users, and representatives of the IMHEX development team led by M-C Power Corporation. ACCT was formed in 1991 to stimulate the commercialization of MCFC's using technology pioneered by the Institute of Gas Technology, and now under commercial development by M-C Power and other IMHEX team members. ACCT's activities since then have reflected M-C Power's step-by-step approach to MCFC commercialization, based on lessons learned from earlier fuel cell efforts by others. ACCT Task Force members have affirmed the following organizational objectives: to increase industry understanding of MCFC technology and applications, and the regulatory and business environment in which they will compete; to help focus and support IMHEX development and demonstration efforts in areas of critical interest to member organizations; to provide opportunities for members to shape commercial power plant design, participate in demonstrations, and share early MCFC experience; to build members' confidence that power plant performance, reliability, and durability can be achieved at competitive costs; and to develop a framework for early power plant purchase commitments.

7941 (DOE/METC–94/1010, pp. 138-144) **Status of Santa Clara MCFC product development test.** Leo, A.J. (Fuel Cell Engineering Corp., Danbury, CT (United States)); Kush, A.K.; O'Shea, T.P. USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States); USDOE Morgantown Energy Technology Center, WV (United States). Aug 1994. DOE Contract FC21-92MC29237. (CONF-940883–: Fuel cells '94, Morgantown, WV (United States), 17-19 Aug 1994). In *Proceedings of the fuel cells '94 contractors review meeting.* 191p. Order Number DE94012285. Source: OSTI; NTIS; GPO Dep.

The objective of the 2MW Santa Clara Demonstration Project is the demonstration of the carbonate fuel cell technology at full scale. Additional objectives of the project include the demonstration of specific advantages of the carbonate fuel cell power plant, such as high efficiency, low emissions, reactive power capability, and high reliability and availability. The project will also provide a design basis for pre-commercial early production power plants.

7942 (DOE/METC–94/1010, pp. 145-148) **Status of 250 kW product development test at San Diego Gas & Electric.** Figueroa, R.A. (San Diego Gas & Electric, CA (United States)); Scroppo, J.A. USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States); USDOE Morgantown Energy Technology Center, WV (United States). Aug 1994. (CONF-940883–: Fuel cells '94, Morgantown, WV (United States), 17-19 Aug 1994). In *Proceedings of the fuel cells '94 contractors review meeting.* 191p. Order Number DE94012285. Source: OSTI; NTIS; GPO Dep.

San Diego Gas & Electric (SDG&E) is participating in the product development test (PDT) program with the Department of Energy (DOE) and M-C Power, Incorporated, in cost sharing the development of M-C Power's internally manifolded heat exchanger (IMHEX) carbonate fuel cells. The results of this work will be a test of a 250 kW net power plant to be installed and operated by SDG&E. SDG&E's responsibilities include host site selection, development and plant construction and operation. The primary purpose of this paper to present an update of the status of the host site for the PDT 250 kW net power plant and progress of manufacturing and supply of key plant components.

7943 (DOE/METC–94/1010, pp. 149-160) **Status of 120-kW direct fuel cell product improvement and testing.** Bernard, R.; Doyon, J.; Paetsch, L.; Patel, P.; Skok, A.; Yuh, C. USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States); USDOE Morgantown Energy Technology Center, WV (United States). Aug 1994. DOE Contract AC21-90MC27168. (CONF-940883–: Fuel cells '94, Morgantown, WV (United States), 17-19 Aug 1994). In *Proceedings of the fuel cells '94 contractors review meeting.* 191p. Order Number DE94012285. Source: OSTI; NTIS; GPO Dep.

ERC's carbonate fuel cell goals are commercialization of MW-Class natural gas/logistic fuel units in the near-term and 100MW-Class coal gas/natural gas dual-fuel units long-term. As a major milestone towards achieving this objective, ERC's subsidiary Fuel Cell Engineering Corp. is constructing a 2MW natural gas power plant at the City of Santa Clara, CA for demonstration in the 1995-1996 time frame. The on-going program effort has prepared this efficient energy conversion technology for the demonstration.

7944 (DOE/METC–94/1010, pp. 161-166) **Status of Unocal product development testing.** Scroppo, J. (UNOCAL, Brea, CA (United States)). USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States); USDOE Morgantown Energy Technology Center, WV (United States). Aug 1994. Contract MCP-9-UNO. (CONF-940883–: Fuel cells '94, Morgantown, WV (United States), 17-19 Aug 1994). In *Proceedings of the fuel cells '94 contractors review meeting.* 191p. Order Number DE94012285. Source: OSTI; NTIS; GPO Dep.

Molten carbonate fuel cells have been under development for many years and on a small scale they can reliably and efficiently produce power. However, they are costly and to compete successfully with other electrical power production methods the cost must be reduced. The partners in this project are building a 250 Kilowatt molten carbonate fuel cell demonstration plant. The plant will show that the technology exists to build large scale molten carbonate fuel cells and operate them successfully. Information obtained from the plant construction and operation will also be used in the design and construction of future plants and will aid in reducing costs. This progress report discusses construction of the demonstration plant at Unocals' Fred L. Hartley Research Center in Brea, California.

7945 (DOE/METC–94/1010, pp. 169-171) **Fuel cells - an international perspective.** Selman, J.R. (Illinois Institute of Technology, Chicago, IL (United States)). USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States); USDOE Morgantown Energy Technology Center, WV (United States). Aug 1994. DOE Contract AC21-90MC27394. (CONF-940883–: Fuel cells '94, Morgantown, WV (United States), 17-19 Aug 1994). In *Proceedings of the fuel cells '94 contractors review meeting.* 191p. Order Number DE94012285. Source: OSTI; NTIS; GPO Dep.

An overview of recent fuel cell development and commercialization plans in Europe and Japan is presented. In Japan, the Moonlight Program which, starting in 1980, led to the successful demonstration and testing of 1 MW PAFCs and 100 kW MCFCs, is now being continued as the "New Sunshine Program," with the goal of demonstrating 1 MW MCFC plants having at least 45% (HHV) efficiency, in 1997. Most major Japanese utilities cooperate with the developers in Technology Research Associations, which take care of developing and optimizing the Balance-of-Plant (BOP). In parallel with these major efforts, SOFC development is being pursued, by private programs funded by utilities as well as government programs. Recently, though, SOFC development appears to

have lost some vigour compared to the advances in MCFC performance, especially of the DIRMCFC. Moreover, since 1992 a solid polymer (PEMFC) fuel cell development program has been started by the Japanese Government. In Europe several national MCFC programs are in progress: in the Netherlands, Italy, and Germany, each closely allied with a U.S. developer. However, the major part of European and government and European Community fuel cell funding goes toward SOFC and PEMFC. The PEMFC development is directed at transportation applications and includes a significant activity in developing direct methanol fuel cells as well as methanol-reformate fueled PEMFCs, in developing direct methanol fuel cells as well as methanol-reformate fueled PEMFCs.

7946 (RISO-R–762(EN)) **Thermoelectric power of solid oxide fuel cell materials.** Ahlgren, E.O. Risoe National Lab., Roskilde (Denmark). Materials Dept.; Danmarks Tekniske Univ., Lyngby (Denmark). Oct 1994. 154p. Order Number DE95737593. Source: OSTI; NTIS; Also available from Risoe Library, P.O. Box 49, DK-4000 Roskilde, Denmark.

Thermoelectric power of state-of-the-art and alternative solid oxide fuel cell (SOFC) materials is investigated. Results are explained by existing theory on thermoelectric power of ionic, electronic and mixed conductors. The formulas are discussed. Methods to determine the ionic transference number and to detect predominant proton conduction are proposed. The thermoelectric effects in an SOFC under operation are estimated. In spite of the Peltier heat being found to be large, the thermoelectric effects in an SOFC will be of limited importance. (au) (7 tabs., 43 ills., 239 refs.)

3008 Miscellaneous Converters

Refer also to citation(s) 7569

32 ENERGY CONSERVATION, CONSUMPTION, AND UTILIZATION

3201 Buildings

Refer also to citation(s) 7257, 7601, 8249

7947 (BNL–52430, pp. 17-26) **Part I - Oil heat technology research and development. Part II - NAECA 2002, what, when, and who?.** Kweller, E. (Dept. of Energy, Washington, DC (United States)); McDonald, R.J. Brookhaven National Lab., Upton, NY (United States). Apr 1994. (CONF-940376–: Oil heat technology conference and workshop, Upton, NY (United States), 24-25 Mar 1994). In *Proceedings of the 1994 oil heat technology conference and workshop.* 216p. Order Number DE95003023. Source: OSTI; NTIS; GPO Dep.

The goal of the BNL Oil Heat R&D program is to reduce residential and small commercial building primary energy use for oil-fired heating systems by 0.35 quad (60 million barrels) annually by the year 2000. The objective is to provide technology advances which allow industry to develop products and adopt practices for cleaner combustion and improved efficiency. A major program goal is the development of low-emission burner and combustion indicator and/or control options which allow optimal performance to be maintained over the heating season. The DOE is mandated by Congress, through the National Appliance Energy Conservation Act of 1987 (NAECA), to periodically review and revise (if warranted) efficiency standards for heating appliances (including oil-fueled). Legislation (NAECA) has standardized labeling practices and established minimum performance levels for all major energy-using residential appliances. DOE developed standardized test procedures to be used in the appliance labeling program administered by the Federal Trade Commission (FTC). The Annual Fuel Utilization Efficiency (AFUE) rating is defined as "the ratio of annual output energy to annual input energy which includes any non-heating season input loss...for gas- or oil-fired furnaces and boilers, AFUE does not include electric energy." The new standards could be written to enforce a minimum AFUE level, as currently employed, or can require specific inclusion of design items, or both. DOE must take into consideration the benefits of any modifications to the current standards versus the costs associated with manufacturing, reliability, safety, and consumer costs associated with the changes. If an increase in the minimum efficiency standards results in an unreasonable cost-to-benefit ratio, DOE would not be likely to pursue it.

7948 (BNL–52430, pp. 27-44) **Oil heat technology - efficiency training manual.** Batey, J.E. (Energy Research Center, Inc., Easton, CT (United States)). Brookhaven National Lab., Upton, NY (United States). Apr 1994. (CONF-940376–: Oil heat technology conference and workshop, Upton, NY (United States), 24-25 Mar 1994). In *Proceedings of the 1994 oil heat technology conference and workshop.* 216p. Order Number DE95003023. Source: OSTI; NTIS; GPO Dep.

Brookhaven National Laboratory (BNL) recently completed work on an Oil Heat Technology - Efficiency Training Manual that was produced to help experienced service technicians improve the efficiency of oil heating systems in homes. It contains the latest information from BNL and other sources concerning the design, installation, adjustment, and servicing of oil heating equipment for the highest efficiency. This manual was written to supplement existing oil heat training manuals that focus primarily on basic design, safety, reliable operation, and repair of oil heating equipment.

7949 (BNL–52430, pp. 45-52) **Update on the build with oil program and the oilheat manufacturers association.** Hedden, R. (Oil Heat Management Services, Pawlet, VT (United States)). Brookhaven National Lab., Upton, NY (United States). Apr 1994. (CONF-940376–: Oil heat technology conference and workshop, Upton, NY (United States), 24-25 Mar 1994). In *Proceedings of the 1994 oil heat technology conference and workshop.* 216p. Order Number DE95003023. Source: OSTI; NTIS; GPO Dep.

For the second year in a row the Oilheat Industry was represented at the National Home Builders Show. Once again over 600 builders stopped at the Build With Oilheat booth and walked away with a better understanding of the advantages of oilheat. The builders were very receptive to the Oilheat Message. They shared a general dissatisfaction with propane, and electrical heat, and even expressed some unhappiness with Natural Gas. The conclusion of those of us working the booth was that the custom home builder can definitely be sold on oilheat as a clean, modern, and energy efficient option for home heating. Someone just has to go sell it to them. The Build With Oil Program was invented by Don Farrel of Fuel Oil & Oil Heat. Don continues to serve as the driving force behind the program. Last year the twenty foot booth appeared not only at the National Home Builders Show, it also appeared at the Mid-Atlantic Builders Show. The Atlantic Region Energy Expo, and the New England Fuel Institute (NEFI) Show. This year, thanks to the support of 34 Oilheat manufacturers and associations, it is scheduled for the National Show in Las Vegas, The New England Builders Conference, The Custom Builders and Remodelers Expo, and the Mid-Atlantic Builders Conference.

7950 (BNL–52430, pp. 53-60) **Canadian R&D on oil-fired combustion systems.** Hayden, A.C.S. (CCRL/ERL/CANMET, Ottawa (Canada)); Entchev, E. Brookhaven National Lab., Upton, NY (United States). Apr 1994. (CONF-940376–: Oil heat technology conference and workshop, Upton, NY (United States), 24-25 Mar 1994). In *Proceedings of the 1994 oil heat technology conference and workshop.* 216p. Order Number DE95003023. Source: OSTI; NTIS; GPO Dep.

This paper describes research and development presently being conducted on oil-fired space and water heating systems at the Combustion & Carbonization Research Laboratory (CCRL) in Ottawa, Canada. A primary topic to be discussed is the R&D program to develop a low output integrated oil heating system, suitable for new, energy-efficient housing. R&D activities at CCRL relating to the development of a seasonal efficiency standard will also be described, as will efforts to resolve issues relating to sidewall venting.

7951 (BNL–52430, pp. 61-76) **Nitrogen oxides (NO_x) and oil burners.** Butcher, T.A. (Brookhaven National Lab., Upton, NY (United States)); Fisher, L.A.; Kamath, B.; Kirchstetter, B.; Batey, J. Brookhaven National Lab., Upton, NY (United States). Apr 1994. (CONF-940376–: Oil heat technology conference and workshop, Upton, NY (United States), 24-25 Mar 1994). In *Proceedings of the*

1994 oil heat technology conference and workshop. 216p. Order Number DE95003023. Source: OSTI; NTIS; GPO Dep.

Without question, there is a worldwide trend toward more restrictive limitations on combustion source emissions of NO_x and other pollutants. Will emission limitations be widely imposed on U.S. residential, oil-fired heating appliances in the future? Even if they remain unregulated, will emissions be an important factor in the energy policies of federal, state and local government? Because of future uncertainties, the oil heat industry should be aware of the level of its emissions relative to other emission sources and fuels. In addition, the industry should understand options available for future emissions reduction. The purpose of this paper is to provide a review of one of the most relevant emissions from oil burners - NO_x. Over 200 years ago, J.B. Priestly did an experiment with a bell jar. He lit yellow phosphorous and burned it in a small porcelain boat floating in water. The whole test was covered with the bell jar with an open stopper. After lighting the phosphorous, he plugged the bell jar. Water started to rise from the bottom and occupied one-fifth of the volume of the jar after the burning stopped. Priestly concluded that only one-fifth of air is oxygen. He called the remaining, inert gas nitrogen. It is this nitrogen from the air as well as the trace amounts of nitrogen in fuels which combine with oxygen in flames to produce NO_x.

7952 (BNL–52430, pp. 77-93) **The fan atomized burner - status and application testing.** Butcher, T.A. (Brookhaven National Lab., Upton, NY (United States)); Celebi, Y.; Fisher, L.A. Brookhaven National Lab., Upton, NY (United States). Apr 1994. (CONF-940376–: Oil heat technology conference and workshop, Upton, NY (United States), 24-25 Mar 1994). In *Proceedings of the 1994 oil heat technology conference and workshop.* 216p. Order Number DE95003023. Source: OST!; NTIS; GPO Dep.

The development of advanced oil burner concepts has long been a part of Brookhaven National Laboratory's (BNL) oil heat research program. Generally, the goals of this work include: increased system efficiency, reduced soot, and the practical extension of the firing rate range of current burners to lower input rates. Secondary, but still obviously important, goals include reduced emissions of other pollutants such as NO_x and firing rate modulation (step or continuous). A number of very interesting designs for achieving some or all of these goals have been developed to varying degrees in the past some as part of the BNL program. Air atomization, blue flame (recirculating), and prevaporization burners have received attention. Reasons why these are not currently available commercially vary but generally include: high cost, poor reliability, excessive complexity (difficult to service) and others.

7953 (BNL–52430, pp. 95-102) **Residential fuel quality study (Part II).** Santa, T.S. (Santa Fuel Inc., Bridgeport, CT (United States)). Brookhaven National Lab., Upton, NY (United States). Apr 1994. (CONF-940376–: Oil heat technology conference and workshop, Upton, NY (United States), 24-25 Mar 1994). In *Proceedings of the 1994 oil heat technology conference and workshop.* 216p. Order Number DE95003023. Source: OSTI; NTIS; GPO Dep.

This is a continuation of a study begun in September 1992 to determine the cause of residential fuel system failures. This is an assessment of actions taken to reduce such failures. While the mechanics of these problems are fairly well known very little has been done to determine the effectiveness of corrective actions in the field. Failure reduction actions in various test areas were initiated beginning in January 1993. These actions included: (1) Change in underground tank filling procedure; (2) Biocide treatment of tanks in a select group of accounts; (3) Introduction of a fuel stability and metal deactivation additive; (4) Use of "spun filament" fuel filter in place of felt medium filter in a select group of accounts. The control benchmark in this study is the data collected in the 9/92 to 1/93 period before corrective actions were initiated. The assessment consists of comparisons of fuel filter change rates for selected test groups of residential heating oil accounts in southern Connecticut for the periods September to December, 1992 versus 1993. Fuel filter changes by date, tank size, fuel filter type and additive treatment type is data which is readily available from most residential fuel supplier data bases.

7954 (BNL–52430, pp. 105-122) **Catalase as an indicator of microbial contamination in fuel oil.** Passman, F.J. (Biodeterioration Control Associates, Chicago, IL (United States)). Brookhaven National Lab., Upton, NY (United States). Apr 1994. (CONF-940376–: Oil heat technology conference and workshop, Upton, NY (United States), 24-25 Mar 1994). In *Proceedings of the 1994 oil heat technology conference and workshop.* 216p. Order Number DE95003023. Source: OSTI; NTIS; GPO Dep.

Uncontrolled microbial contamination in fuel systems has a significant adverse economic impact on burner and generator operations. Participants in the fuel refining, distribution, retailing and consumption markets have only recently begun to recognize this fact. One reason for this is that research on the relationship between microbial growth and fuel performance problems rarely reaches a broad industrial audience in the past. Additionally, many engineers and fuel chemists perceived microbiology to be an arcane science, which relied on methodologies significantly different from those in which they had been trained. Consequently, analysts rarely included microbiological assays in routine fuel quality testing programs. Plugged filters, heavy sludge deposits, high acid numbers and spot corrosion were rarely attributed to uncontrolled microbial contamination. Obtaining timely accurate microbiological data remains obstacle to effective contamination control.

7955 (BNL–52430, pp. 123-130) **Premium performance heating oil.** Hoskin, D. (Mobil Research and Development Corporation, Paulsboro, NJ (United States)); McClintock, B.; Esposito, F.; Trout, R.; Martenak, T. Brookhaven National Lab., Upton, NY (United States). Apr 1994. (CONF-940376–: Oil heat technology conference and workshop, Upton, NY (United States), 24-25 Mar 1994). In *Proceedings of the 1994 oil heat technology conference and workshop.* 216p. Order Number DE95003023. Source: OSTI; NTIS; GPO Dep.

This paper describes three aspects of heating oil quality where premium performance may prove valuable to the oil heat industry: fuel stability, dispersancy, and corrosion. Bench tests previously developed to quantify fuel stability (Accelerated Stability Test) and dispersancy performance (Sundstrand Pump Test) are described in detail. Experimental results are presented that show heating oil stability, dispersancy, and corrosion performance can be significantly improved in the bench tests by the appropriate application of additive technology. The improvements in fuel stability and corrosion are studied as a function of the additive treat rate. The beneficial effects of improved fuel oil stability and dispersancy on unscheduled maintenance are discussed. Improved fuel stability reduces sludge formation. Improved dispersancy reduces the agglomeration of particulates. In unison, these improvements in fuel performance should act to reduce the incidence of plugged nozzles, filters, and screens in heating equipment. This results in improved customer satisfaction and reduced unscheduled maintenance costs. Further work is ongoing in conjunction with the test-market introduction of an improved stability, dispersancy, corrosion, and detergency heating oil to determine its impact on burner operation and maintenance requirements.

7956 (BNL–52430, pp. 131-146) **Design study for advanced flame quality indicator.** Posillico, T. (Brookhaven National Lab., Upton, NY (United States)). Brookhaven National Lab., Upton, NY (United States). Apr 1994. (CONF-940376–: Oil heat technology conference and workshop, Upton, NY (United States), 24-25 Mar 1994). In *Proceedings of the 1994 oil heat technology conference and workshop.* 216p. Order Number DE95003023. Source: OSTI; NTIS; GPO Dep.

This paper will discuss the research done at Brookhaven National Laboratory (BNL) in support of identifying and evaluating options for an advanced multicolor Flame Quality Indicator (FQI) system. Advantages over the current FQI design are described, including obtaining a universal setpoint that is independent of firing rate and combustion chamber configuration. Various designs will be explored, specifically a fully integrated arrangement that can be used with an automatic excess air control system and/or a portable service tool version. The paper will also summarize optical measurements of burner flames made with BNL's Optical Multichannel Analyzer (OMA) system and recommend and describe hardware,

mounting, and cost options for a prototype advanced FQI system design.

7957 (BNL–52430, pp. 147-156) **Results of the validation of the oil heat vent analysis program (OHVAP).** Strasser, J. (Brookhaven National Lab., Upton, NY (United States)); Krajewski, R.F. Brookhaven National Lab., Upton, NY (United States). Apr 1994. (CONF-940376–: Oil heat technology conference and workshop, Upton, NY (United States), 24-25 Mar 1994). In *Proceedings of the 1994 oil heat technology conference and workshop.* 216p. Order Number DE95003023. Source: OSTI; NTIS; GPO Dep.

This paper presents relevant background information and the preliminary validation results for the Oil Heat Vent Analysis Program (OHVAP). The program's calculations are presented in graphical form and compared with experimental data. The OHVAP results are also compared with results obtained using a steady state analysis.

7958 (BNL–52430, pp. 157-168) **Development of oil heat chimney venting tables.** Krajewski, R.F. (Brookhaven National Lab., Upton, NY (United States)). Brookhaven National Lab., Upton, NY (United States). Apr 1994. (CONF-940376–: Oil heat technology conference and workshop, Upton, NY (United States), 24-25 Mar 1994). In *Proceedings of the 1994 oil heat technology conference and workshop.* 216p. Order Number DE95003023. Source: OSTI; NTIS; GPO Dep.

This paper presents an overview of the groundwork which is underway in developing a set of rational guidelines in the form of venting tables for the installation of chimney vent systems for mid- and high-efficiency oil-fired heating appliances. The development of a prescriptive format for the tables is considered essential in terms of maintaining an ease of choice for the installer both in the sense of physical geometry and in cost estimates for the system. A set of "straw-man" chimney venting tables have been generated using a steady-state (non-transient) computer program. This was done in order to present an appropriate format, with approximate projections of chimney vent behavior for industry consideration. The assumptions used in the calculations and examples of the computed results are presented. An example of a completed table is shown together with a discussion of the rational for particular vent geometry choices.

7959 (BNL–60978) **Measurement of thermal regain in duct systems located in partially conditioned buffer spaces. Informal report.** Andrews, J.W. Brookhaven National Lab., Upton, NY (United States). Jul 1994. 22p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. Order Number DE95004839. Source: OSTI; NTIS; GPO Dep.

Thermal losses from duct systems have been shown to be a significant fraction of the heat or cooling energy delivered by the space-conditioning equipment. However, when the ducts are located in a partially conditioned buffer space such as a basement, a portion of these losses are effectively regained through system interactions with the building. This paper presents two methods of measuring this regain effect. One is based on the relative thermal resistances between the conditioned space and the buffer space, on the one hand, and between the buffer space and the outside, on the other. The second method is based on a measured drop in the buffer-space temperature when steps are taken to reduce the duct losses. The second method is compared with results of an extensive research project that are published in a major professional society handbook. The thermal regain fraction using the drop in basement temperature was found to be 0.68, while that obtained from an analysis of the system performance data, without using the basement temperature, was 0.59.

7960 (DOE/BP–2458) **Field measurements of heating efficiency of electric forced-air furnaces in six manufactured homes.** Davis, B.; Palmiter, L.; Siegel, J. Ecotope, Inc., Seattle, WA (United States). 26 Jul 1994. 39p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AM79-91BP13330. Order Number DE95004887. Source: OSTI; NTIS; GPO Dep.

This report presents the results of field measurements of heating efficiency for six manufactured homes in the Pacific Northwest heated with electric forced-air systems. This is the first in a series of regional and national efforts to measure in detail the heating efficiency of manufactured homes. Only six homes were included in this study because of budgetary constraints; therefore this is not a representative sample. These investigations do provide some useful information on the heating efficiency of these homes. Useful comparisons can be drawn between these study homes and site-built heating efficiencies measured with a similar protocol. The protocol used to test these homes is very similar to another Ecotope protocol used in the study conducted in 1992 and 1993 for the Bonneville Power Administration to test the heating efficiency of 24 homes. This protocol combined real-time power measurements of furnace energy usage with energy usage during co-heat periods. Accessory data such as house and duct tightness measurements and tracer gas measurements were used to describe these homes and their heating system efficiency. Ensuring that manufactured housing is constructed in an energy and resource efficient manner is of increasing concern to manufactured home builders and consumers. No comparable work has been done to measure the heating system efficiency of MCS manufactured homes, although some co-heat tests have been performed on manufactured homes heated with natural gas to validate HUD thermal standards. It is expected that later in 1994 more research of this kind will be conducted, and perhaps a less costly and less time-consuming method for testing efficiencies will be develops.

7961 (DOE/CE/21009–T1) **Turning research into results, final report.** ACEC Research and Management Foundation, Washington, DC (United States). May 1993. 66p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG01-90CE21009. Order Number DE95005456. Source: OSTI; NTIS; GPO Dep.

Includes booklet, "An Introduction to Energy Efficient Technologies for Existing Buildings for Building Owners and Managers," November 1992.

In September 1989, the ACEC Research and Management Foundation (ACEC/RMF) submitted a proposal to the US Department of Energy (DOE) in response to the Existing Buildings Efficiency Program's Solicitation Number DE-PS01-89CE21034. On May 15, 1990, DOE informed ACEC/RMF that it had been selected for a grant award; the final agreement was signed on July 23, 1990. The purpose of the effort was to develop an information package showing engineering firms that energy services can be sold to owners and developers successfully and profitably, that not every design that goes beyond code results in a lawsuit, that owners can be shown the value of paying for the additional design analysis that energy efficiency design requires. The package was envisioned to include examples of buildings that succeed in terms of energy, cost, and design team benefits. It was further conceptualized as both a technical and marketing resource to provide helpful facts, references to relevant documents, graphic materials to be used during client presentations, and guidance on the latest in useful research results.

7962 (DOE/CE/23810–48C) **Sealed tube comparisons of the compatibility of desiccants with refrigerants and lubricants. Quarterly technical progress report, July 1994–September 1994.** Field, J.E. (Spauschus Associates, Inc., Stockbridge, GA (United States)). Air-Conditioning and Refrigeration Technology Inst., Inc., Arlington, VA (United States); Spauschus Associates, Inc., Stockbridge, GA (United States). Oct 1994. 95p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-91CE23810. Order Number DE95005666. Source: OSTI; NTIS; GPO Dep.

Continuing environmental concerns mandate replacement of CFC's with alternate refrigeration fluids. At this time relatively little testing has been reported in the literature for compatibility of desiccants in these new working fluids. Using bench scale test methods generally accepted throughout the industry today, this work will provide data necessary to assess the compatibility of virtually all of the currently used desiccant types – both bead and molded core, with thirteen refrigerant/lubricant combinations. The desiccants are tested by exposure to refrigerant and lubricant in–1989. After aging, the liquid phase is evaluated for acid anion formation, change in color, and presence of halide ions, the gas phase is analyzed for refrigerant decomposition by gas chromatography, and the desiccants are evaluated for changes in crush strength and for retention of acids and halide ions. Metal catalysts, also present in the sealed

tubes, are visually examined for corrosion, copper plating, and appearance changes.

7963 (DOE/EE–0025) **Windows and daylighting: A brighter outlook.** USDOE Assistant Secretary for Energy Efficiency and Renewable Energy, Washington, DC (United States). Nov 1994. 15p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95007021. Source: OSTI; NTIS; GPO Dep.

This is an overview of energy efficient window glazing and framing technology. The topics of the report include: windows and energy use, a point of view; a challenging federal opportunity; DOE window research; advanced optical technologies such as spectrally selective glazing, switchable glazing, super windows with low-emissivity coatings and noble gas fills; and performance evaluation and design tools.

7964 (KE–93003B) **A study on the performance evaluation technique of prefabricated Ondol(II).** Hong, S.H. (Korea Institute of Energy Research, Taejon (Korea, Republic of)); Min, J.H.; Yoon, Y.J.; Cho, S. No corporate text available. Dec 1993. 98p. (In Korean). Order Number DE95744291. Source: OSTI; NTIS (US Sales Only).

The measuring equipments for thermal performance of the prefabricated Ondol panel using hot water was developed and the performance evaluation techniques of the Ondol panel heating system was improved. Indoor thermal environment was predicted using the simulation program to verify the applicability of the prefabricated Ondol panel. In order to analyze the actual conditions energy transmission system, some examples of the United States and Germany were investigated and the characteristics of several methods of energy transmission were surveyed. (author). refs., figs., tabs.

7965 (KE–93004B) **Study on the hydrogen production and cathodic protection using photovoltaic systems.** Kim, B.H. (Korea Institute of Energy Research, Taejon (Korea, Republic of)); Park, Y.J.; Jung, M.W.; Kim, H.W. No corporate text available. Dec 1993. 203p. (In Korean). Order Number DE95744267. Source: OSTI; NTIS (US Sales Only).

This paper is studied on the potential variation of electrode against environment conditions, soil resistivity and electrode resistance for cathodic protection. Base on this analysis, the following results for designing PV powered cathodic protection are obtained. (1) Select an anode and groundbed with low internal resistance. For the underground applications, a graphite anode surrounded by metallurgical coke breeze is appropriate. For underwater or wetter applications, conductive EPDM rubber may be more suitable than platinum. (2) If anode replacement is not a problem, consider the use of magnesium or zinc for the goundbed anode. (3) Use multiple anodes connected in parallel to minimize anode resistance (4) Install underground anodes so that stay moist as long as possible reduction is system performance over time and a possible increase in the cathodic protection current requirement. (author). refs., figs., tabs.

7966 (KE–93004G) **Standardization of direct and global solar radiation in Korea (II).** Jeon, H.S. (Korea Institute of Energy Research, Taejon (Korea, Republic of)); Cho, S.H.; Oh, J.M.; Kim, E.I.; Jo, D.K.; Lee, T.K.; Kim, D.H.; Lee, S.M.; Jun, I.S. No corporate text available. Dec 1993. 354p. (In Korean). Order Number DE95744273. Source: OSTI; NTIS (US Sales Only).

The objective of this project is preparation of engineering data to help meet the needs of industry, engineers, researchers and government for solar radiation data, models, and assessments, as required to develop, design, deploy, and operate energy conversion and solar energy conversion systems. The specific goals of this work can be classified as follows (1) Collection and assessment of insolation data through 16 site network (2) Error analysis of measured insolation data (3) Calibration technique for measurement device sensibility (4) Analysis of regional insolation components (5) Evaluation of insolation components in high altitude. (author). refs., figs., tabs.

7967 (KE–93005B) **A study on retrofit measures of KIER buildings for energy conservation.** Park, H.S. (Korea Institute of Energy Research, Taejon (Korea, Republic of)); Yoo, H.H.; Chang, H.J.; Chang, M.S. No corporate text available. Mar 1994. 309p. (In Korean). Order Number DE95744290. Source: OSTI; NTIS (US Sales Only).

Buildings of KIER that were constructed in 1980 consume much energy, because of outworn equipments(boiler, refrigerator, fan coil unit, piping) and windows facing to the west of main research building and irrational operation of H.V.A.C system. The purpose of this study is to present retrofit measures for the improvement of energy performance and indoor environment on KIER building by investigation and testing actual living conditions. From these results, we obtained 27.6% energy saving of heating and cooling load in KIER building. (author). refs., figs., tabs.

7968 (KE–93005S) **Development of Direct Contact Heat Exchangers for solar energy utilization (III).** Kang, Y.H. (Korea Institute of Energy Research, Taejon (Korea, Republic of)); Jeon, M.S.; Yoon, H.K.; Kwak, H.Y.; Lee, N.H.; Yoon, J.H.; Yoo, C.K.; Lim, S.H.; Chun, W.G.; Won, S.H.; Kim, J.B.; Kim, N.J. No corporate text available. Oct 1994. 131p. (In Korean). Order Number DE95744270. Source: OSTI; NTIS (US Sales Only).

The Direct Contact Heat Exchanger(DCHX) has been widely studied in the chemical industry for many years due to its inherent simplicity as a counter-current device for heat and mass transfer. The use of a Direct Contact Heat Exchanger, if properly applied, will allow several benefits. Primarily these include the elimination of the cost of a closed heat exhanger and the ability to operate with much lower temperature differences. Systems using Direct Contact Heat Exchangers are quite similar to Systems using indirect heat exchangers in many respects. In these systems, the DCHX unit can be combined with the thermal storage unit, or alternatively, it can be used separately from the storage unit, much like an external (to storage) closed heat exchanger system. Hence, either the DCHX system or the closed heat exchanger system can operate with the same number of pumps/loops. Some flow directions may be different between the two types of systems, depending upon the fluids used in the DCHX system. This is because the DCHX generally relies upon the force of gravity ot accomplish the fluid flow within the device. In the present work, the spray column type of direct contact heat exchangers are studied extensively to harness the solar energy for spaced heating. To carry out the flow analysis of working fluid in the spray column, numerical simulations are carried out extensively with the axi-symetric 2-dimensional two fluid model. In the simulation results, operation conditions have to be controlled to have a wide injection area, injection hole and small flow rate in the injection part to obtain uniform velocity distribution for maximum heat transfer in the main part of spray column. Some of the major considerations that are involved in the design of heat exchangers in this study are that; working fluid is a hydrocarbon (such as Texaterm) or water which is either lighter or heavier than storage medium.

7969 (KE–93006S) **Development of the high performance phase change heat transfer system(II).** Yang, Y.S. (Korea Institute of Energy Research, Taejon (Korea, Republic of)); Lee, D.W.; Yoon, E.S.; Ju, M.C. No corporate text available. Nov 1994. 103p. (In Korean). Order Number DE95744266. Source: OSTI; NTIS (US Sales Only).

Experimental study on the closed two-phase thermosyphon loop system using the F-113 were performed. The results showed that the heat transfer efficiency was raising in accordance with increasing of the temperature difference between heat source and heat sink. And it showed that the pertinent fluid charge also existed. It can be also found that the relation between the loop pressure and the heater exit temperature is available to find the datum point which can decide the performance of a system. (author). refs., figs., tabs.

7970 (KE–93008S) **Development of high efficient process for simultaneous removal of SOx and NOx from flue gas (III).** Lee, H.K. (Korea Institute of Energy Research, Taejon (Korea, Republic of)); Kim, C.H.; Choi, I.S.; Kim, Y.I.; Min, B.M.; Park, S.D.; Choi, W.K.; Bak, I.H.; Kim, J.G.; Cho, H.D.; Lee, J.S.; Kim, S.U.; Lee, W.S. No corporate text available. Oct 1994. 191p. (In Korean). Order Number DE95744279. Source: OSTI; NTIS (US Sales Only).

The object of this research is to develop the simultaneous SOx and NOx removal process from flue gases using limestone and P4

additive. The research results are as follows; 1. Phosphorus oxy acids produced by reaction of P4 and O2 were PO43-, PO33-, and PO23-, and ion concentration distribution in the reactor solution was more than 50% PO43-, less than 50% of PO33- and small amount of PO23-. Total ion concentration in both a reactor and washing column was PO43- of 77%, PO33- of 12.9% and PO23- of 10.1%. The byproduct produced from the oxidation of P4 was recovered as a phosphoric acid up to 98% using one washing column. 2. The effects of L/G, pH, inlet SO_2 concentration were tested by long term experiments in the mini-pilot scale system. The measured change in SO_2 pickup was a linear function of the inlet SO_2 concentration over the range of SO_2 concentrations tested. 3. The increase of P4 concentration from 0.1 to 0.5 w/w% increased the P/NO mole ratio from 2.0 to 4.2 and consumption rate of limestone increased linearly in the mini-pilot scale system. The increase of inlet NO concentration from 270 ppm to 750 ppm decreased the P /NO ratio from 3.2 to 2.0. As the L/G ratio increased from 47.4 to 67.5, the maximum removal efficiency of NO was increased from 71.9 to 89.6%, and P/NO ratio was decreased from 3.2 to 2.2 in the mini-pilot scale system. 4. Sulfite oxidation reaction was investigated to use the byproduct in the lab-scale apparatus. When we keep the reaction order of 1.5, the rate constants were 3.19 x 10-4, and 8.95 x 10-4 when the pH were 4.5 and 9.5, respectively. The catalytic activity of Mn_2^+ was much higher than that of Mg_2^+ even though the concentration of Mn_2^+ was lower than Mg_2^+. (author). refs., figs., tabs.

7971 (KE–93010S) **Development of industrial waste heat recovery system using chemical heat pump with NH_3-salt(I).** Choi, I.S. (Korea Institute of Energy Research, Taejon (Korea, Republic of)); Kim, Y.I.; Kim, C.H.; Min, B.M.; Choi, W.K.; Bak, I.H.; Kim, J.G.; Lee, J.S. No corporate text available. Mar 1994. 134p. (In Korean). Order Number DE95744277. Source: OSTI; NTIS (US Sales Only).

The objective of this research is to develop industrial waste heat recovery system using chemical heat pump with adopt NH_3-salt as a medium. Generally, the chemical heat pump is more efficient than compression type heat pump. Furthermore, it is one of the system which doesn't use any CFCs whose productions and uses are scheduled to be phased out worldwide by Montreal Protocol. Therefore, the chemical heat pump will be expected as the heat pump for next generation. The use of this chemical heat pump system to utilize the industrial waste heat will also save huge amount of energy available. The final object of this study is to design the chemical heat pump utilize the industrial waste heat using STELF process. The first year research was accomplished the basic literature survey for chemical heat pump and steady state simulation (level 0 design). Also, the batch type STELF system whose capacity is 1 kw(storage time:1 hr) was designed to use level 0 design program. (author). refs., figs., tabs.

7972 (KE–93011G) **Study on the environment of passive solar schoolrooms (II).** Lim, S.H. (Korea Institute of Energy Research, Taejon (Korea, Republic of)); Chun, W.G.; Yoon, J.H.; Lee, N.H.; Won, S.H.; Kang, Y.H.; Jeon, M.S.; Yu, C.K.; Yun, H.K.; Kwak, H.Y.; Boo, J.H. No corporate text available. Dec 1993. 107p. (In Korean). Order Number DE95744272. Source: OSTI; NTIS (US Sales Only).

The present study has investigated various problems with the classroom in the existing elementary and (junior) high school buildings from the point of indoor environment, and made some suggestions for possible solutions. Following the oil crisis in 1979, there have been surge of movements by the government in Korea to conserve petroleum-based energy in every sector of society. One of these movements was the application of passive solar technologies into the construction of school buildings. Various passive designs are developed paying special regard to architectural and climatic factors. Apart from the configurations of 1980 and 1982, the passive design proposed by KIER in 1987 locates the hallway on the south side of the building so that it could be used as an attached sun space for each classroom. Temperature variations of the interior(classroom and corridor) are simulated with a well-known numerical procedure for three different classroom models aforementioned. The conventional school building design, which locates the hallway on the north side of the classroom, has proven to be very ineffective for indoor light control. Especially, glares and dark spots on the work plane as well as nonuniform illuminance on the chalk board were causing undesirable visual effects for the students. The present study has revealed that the thermal performance of the 1987 model with attached sun space could become most efficient, which is yet to be verified by actual measurements. To carry out numerical analysis, the Eulerian method is used with some restrictions on the time step. Especially, the solutions of the 1982 model with iron plate have shown sensitiveness with time steps. The simulated results obtained are based on the physical properties given in ASHRAE Handbook. (author). refs., figs., tabs.

7973 (KE–93013B) **Development of processing technique for the electrochromic window.** Kim, D.H. (Korea Institute of Energy Research, Taejon (Korea, Republic of)); Cho, S.H.; Lee, T.K.; Chun, W.G.; Jeon, M.S. No corporate text available. Dec 1993. 91p. (In Korean). Order Number DE95744274. Source: OSTI; NTIS (US Sales Only).

The electrical load for the comfortable indoor atmosphere has increased. Currently, windows have poor energy management properties. These problems could be solved by the development of adjustable optical shutter so called electrochromic windows. The electrochromism is a reversible color change in a material caused by an applied electric field or current. The electrochromic materials can be applied to the field of the electronic information display and micro battery. However, studies concerned this topic has been ignored as compared to the some advanced countries. It is important to develop the material itself and its processing technique. The final goal of the basic research is the development of processing technique and test for the electrochromic window for the efficient utilization of the solar energy. That is, the feasibility of the electrochromic materials was investigated and the processes and its capability was developed in this research. There has been various techniques for the thin film processes. The researches related to the application for the electrochromic window has been neglected and somewhat theoretical from the view point of energy savings. The various processes were applied to make thin films, which were compared with respect to its durability, reproducibility and economic aspects. Three different electrochromic materials for different thin film processes are involved in the present study. W03 thin film from RF sputtering method was light blue and transparent. The anodically formed NiO showed dark brown color but experienced aging effect. The sol-gel dipping process for TiO_2 thin film was successful to obtain uniform anatase phase, but electrochromic property was not displayed mainly due to the improper electrolyte and electrode. The feasibility of thin film processing for electrochromic window has been established by the experimental results. (author). refs., figs., tabs.

7974 (KE–93014G) **A study on energy conservation in heat source distribution system(II).** Tae, C.S. (Korea Institute of Energy Research, Taejon (Korea, Republic of)); Park, S.D.; Seo, H.S.; Shin, K.S.; Yoo, S.S. No corporate text available. Dec 1993. 180p. (In Korean). Order Number DE95744289. Source: OSTI; NTIS (US Sales Only).

The objective of this study is reduce the energy consumption for heat source distribution in HVAC systems. We carry out the investigate about building energy reduction method in heat source distribution system and the present tendency of decentralized HVAC systems and equipments. And develop the building energy analysis program to calculate the energy consumption precisely in heat source distribution system. We prepare the sample designs which adoped natural circulation of refregerant and calculate the energy consumption for each sample design. (author). refs., figs., tabs.

7975 (KE–93020G) **A Study on energy oriented intelligent building system(II) - development of emulator/tester.** Seo, H.S. (Korea Institute of Energy Research, Taejon (Korea, Republic of)); Park, S.D.; Shin, K.S.; Tae, C.S.; Yoo, S.S. No corporate text available. Dec 1993. 110p. (In Korean). Order Number DE95744292. Source: OSTI; NTIS (US Sales Only).

EIBS which controls the HVAC systems is one portion of Intelligent Building in buildings. Its performance is directly related to the amount of energy consumed in a building and the comfort of the building occupants. One approach to evaluate the performance of

an EIBS is through the use of an Emulator. This is a special computer/data acquisition system that is connected to the sensor inputs and command outputs of the EIBS. It replaces the HVAC system and building and use a computer program to simulate their response to EIBS commands. This report contains guidelines to design the emulator and present its design example. (author). refs., figs., tabs.

7976 (KE–93027G) **A study on the energy database establishment.** Oh, C.S. (Korea Institute of Energy Research, Taejon (Korea, Republic of)); Shin, H.S.; Lee, B.S.; Jung, C.Y.; Kim, D.S.; Bae, L.H. No corporate text available. Dec 1993. 124p. (In Korean). Order Number DE95744276. Source: OSTI; NTIS (US Sales Only).

This energy database has been designed and built to cover subjects scope of energy related scientific and technical information. The information sources include journal articles, research reports, conference literature, patents, and energy related statistics. And the automatic indexing system for energy literature is developed for selecting proper index terms in Korean literatures. (author). refs., figs., tabs.

7977 (KE–93032G) **Efficiency evaluation and plan for extensive use of newly developed energy saving products- OA equipment energy saver and vehicle fuel economizer.** Shin, H.S. (Korea Institute of Energy Research, Taejon (Korea, Republic of)); Kwon, C.H.; Lee, Y.J.; Ko, C.J.; Kim, J.P.; Lee, B.S.; Kim, D.S.; Lee, S.G.; Hong, J.C.; Kim, B.S.; Kwon, O.S.; Bae, L.H. No corporate text available. Dec 1993. 161p. (In Korean). Order Number DE95744275. Source: OSTI; NTIS (US Sales Only).

PC-electricity saver was effective and reliable, but it was not economical yet. Since the price of these devices are so expensive comparing with electricity saving. The pay-back period was calculated 9 to 15 years roughly. Chassis dynamometer tests show the fuel economy changes between 1.8% deterioration to 1.8% improvement, and monitoring tests show little changes in vehicle performance with these devices. Finally, it was concluded that there are little effects of the vehicle fuel economizers on vehicle fuel economy in the present test results. (author). refs., figs., tabs.

7978 (KE–93033G) **A study on the optimum operation methodology of small hydro power plants(I).** Lee, C.H. (Korea Institute of Energy Research, Taejon (Korea, Republic of)); Park, W.S.; Choi, C.J.; Yoo, S.W. No corporate text available. Dec 1993. 113p. (In Korean). Order Number DE95744268. Source: OSTI; NTIS (US Sales Only).

Precise analysis of the performance characteristics for small hydro power plants must be carefully considered to develop hydro power resources effectively. In order to achieve this objective, the performance characteristics of two existing small hydro power plants located in Han-river system and Keum-river system were analyzed. Also, based on the results analyzed from this study, rational operation methods were suggested. The performance characteristics such as annual average load factor and annual average electricity production were analyzed by using performance prediction model developed for two existing small hydro power plants located in Han-river system and Keum-river system. Also, the hydrological characteristics such as flow discharge - water level relation and rainfall - flow discharge relation were analyzed. And the rational operation method of small hydro power plants was suggested by analyzing operation records. (author). refs., figs., tabs.

7979 (KE–93034G) **Detailed survey of wind energy on Cheju Province for the feasibility study of wind farm(II).** Park, K.H. (Korea Institute of Energy Research, Taejon (Korea, Republic of)); Kim, K.H.; Yoo, S.W. No corporate text available. Dec 1993. 230p. (In Korean). Order Number DE95744269. Source: OSTI; NTIS (US Sales Only).

To obtain the feasibility result of wind farm in our country, first of all, the detailed survey of wind energy on Cheju Province which is known as the area of abundant wind energy, but more electricity supply is needed because of rapidly increasing electricity consumption, was carried out. The contents of this report are summarized as follows; - Survey of wind energy utilization and wind energy analysis technique - Analysis of wind energy characteristics in Cheju Province - Development of wind energy analysis program This program provides 13 summarized analysis result and 34 detailed analysis result. And for the convenient understanding of wind energy characteristics, the graphic program was developed which enables to display the graph drawing in the monitor. (author). refs., figs., tabs.

7980 (KTM/E-D–202) **Heat cost allocation in Finland.** Kimari, R. Ministry of Trade and Industry, Helsinki (Finland). Energy Dept. 1994. 124p. (In Finnish). Project KTM-TERMO-3.8. Order Number DE95737598. Source: OSTI; NTIS.

TERMO - District heating research programme.

This study examines the possibilities to share the heating costs in a fair way in dwellings equipped with water circulated central heating. This study presents the most common principles of heat cost allocation, the legislation and commercial equipment used in Central Europe. It is clear that heat cost allocation, information and higher prices decrease the consumption, but the references used in the study could not prove exactly, how great an influence the heat cost allocation has on the heat consumption. Not all the cheapest methods of heat cost allocation will work with a proper accuracy in those low temperature levels used typically in Finnish buildings. None of the radiators installed before 1994 have been tested in laboratory according to the standards. The fair allocation of heating costs requires compensation of different location and direction of the dwellings and also heat transmission between the dwellings at different indoor temperatures. The systems which can take those factors into account are far too expensive for profitable metering (orig.)

7981 (LBL–34638) **The design and evaluation of integrated envelope and lighting control strategies for commercial buildings.** Lee, E.S.; Selkowitz, S.E. Lawrence Berkeley Lab., CA (United States). Jun 1994. 18p. Sponsored by USDOE, Washington, DC (United States);California Inst. for Energy Efficiency, Berkeley, CA (United States). DOE Contract AC03-76SF00098. (CONF-950104–3: American Society of Heating, Refrigerating and Air-Conditioning Engineers winter meeting and exhibition, Chicago, IL (United States), 28 Jan - 1 feb 1995). Order Number DE95004676. Source: OSTI; NTIS; GPO Dep.

This study investigates control strategies for coordinating the variable solar-optical properties of a dynamic building envelope system with a daylight controlled electric lighting system to reduce electricity consumption and increase comfort in the perimeter zone of commercial buildings. Control strategy design can be based on either simple, instantaneous measured data, or on complex, predictive algorithms that estimate the energy consumption for a selected operating state of the dynamic envelope and lighting system. The potential benefits of optimizing the operation of a dynamic envelope and lighting system are (1) significant reductions in electrical energy end-uses - lighting, and cooling due to solar and lighting heat gains - over that achieved by conventional static envelope and lighting systems, (2) significant reductions in peak demand, and (3) increased occupant visual and thermal comfort. The DOE-2 building energy simulation program was used to model two dynamic envelope and lighting systems, an automated venetian blind and an electrochromic glazing system, and their control strategies under a range of building conditions. The energy performance of simple control strategies are compared to the optimum performance of a theoretical envelope and lighting system to determine the maximum potential benefit of using more complex, predictive control algorithms. Results indicate that (1) predictive control algorithms may significantly increase the energy-efficiency of systems with non-optimal solar-optical properties such as the automated venetian blind, and (2) simpler, non-predictive control strategies may suffice for more advanced envelope systems 1 incorporating spectrally selective, narrow-band electrochromic coatings.

7982 (LBL–35982) **Evaluation of advanced technologies for residential appliances and residential and commercial lighting.** Turiel, I.; Atkinson, B.; Boghosian, S.; Chan, P.; Jennings, J.; Lutz, J.; McMahon, J.; Rosenquist, G. Lawrence Berkeley Lab., CA (United States). Jan 1995. 153p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00098. Order Number DE95006720. Source: OSTI; NTIS; GPO Dep.

Section 127 of the Energy Policy Act requires that the Department of Energy (DOE) prepare a report to Congress on the

potential for the development and commercialization of appliances that substantially exceed the present federal or state efficiency standards. Candidate high-efficiency appliances must meet several criteria including: the potential exists for substantial improvement (beyond the minimum established in law) of the appliance's energy efficiency; electric, water, or gas utilities are prepared to support and promote the commercialization of such appliances; manufacturers are unlikely to undertake development and commercialization of such appliances on their own, or development and production would be substantially accelerated by support to manufacturers. This report describes options to improve the efficiency of residential appliances, including water heaters, clothes washers and dryers, refrigerator/freezers, dishwashers, space heating and cooling devices, as well as residential and commercial lighting products. Data from this report (particularly Appendix 1)were used to prepare the report to Congress mentioned previously. For the residential sector, national energy savings are calculated using the LBL Residential Energy Model. This model projects the number of households and appliance saturations over time. First, end-use consumption is calculated for a base case where models that only meet the standard replace existing models as these reach the end of their lifetime. Second, models with efficiencies equal to the technology under consideration replace existing models that reach the end of their lifetime. For the commercial sector, the COMMEND model was utilized to project national energy savings from new technologies. In this report, energy savings are shown for the period 1988 to 2015.

7983 (LUTADL-TABK–1004) **Tracer gas measurement techniques. Active methods to identify volumes, air flows, flow paths and flow patterns in single family houses.** Hedin, B. Lund Univ. (Sweden). Dept of Building Technology. Nov 1994. 269p. (In Swedish). Project BFR-930300. Order Number DE95737668. Source: OSTI; NTIS.

Also available from: Lunds Univ., Dept. of Building Technology, P.O. Box 118, S-221 00 LUND, Sweden.

This thesis Deals with two different models for the description of a flow system and methods for the identification of these models using tracer gas measurements. The methods have been tested in extensive experiments in four single family houses. The idealized multi zone model - which consists of one or more perfectly mixed zones which may be coupled with the flows - has been used to determine air flows and ventilated volumes in single family houses. The most straightforward method of describing a flow system is by its weighting function which expresses the relationship between the injection of tracer gas at one point and the concentration of tracer gas at another points. The main problem in modelling by using the weighting function is that the present method does not include infiltration in the calculations, but regards it as a residual item. Field measurements show that the tracer gas methods used provide valuable knowledge of how the ventilation system in a single family house works. Nor it is possible to acquire this knowledge without tracer gas measurements. However, one essential limitation of the tracer gas method is that it is a tool which described only the present situation. It is difficult to generalize the results to cover that happens when conditions change, e.g. when the house is made more airtight, when ventilation is run at a higher speed or when a window is opened. On the other hand. measurements made in houses of the same type and similar conditions exhibit almost identical results. This is encouraging and indicated that results measured in one house can be generalised to other similar houses. It should therefore be possible for a house producer, for instance on the basis of measurements in a reference house, to draw general conclusions regarding all houses of the same type. Numerous figs and tabs

7984 (NBI-PR–160-1994) **Reasonably-priced low energy houses - heat recovery. New, simple system for residential ventilation.** Gundersen, P. Norges Byggforskningsinstitutt, Oslo (Norway). Jun 1994. 72p. (In Norwegian). Order Number DE95737645. Source: OSTI; NTIS.

The report deals with an energy saving and cost effective ventilation plant which is an important element in the Norwegian project "Reasonably-priced low energy houses". The energy saving measures which are both easy and safe in operation with a minimum of maintenance, are to be integrated into the building structure in the planning phase. The plant is equipped with a noise reducer, and a system design for the operation control, is shown. The report shows the alternative methods of plant design, which include the location of an heat exchanger and a system of soil-covered pipes. A cost quotation for the plant is given. A new project with the aim of developing a ventilation aggregate with natural circulation, is briefly dealt with. 4 refs., 24 figs., 5 tabs.

7985 (NEI-DK–1796) **Daylighting in business buildings. State report.** Dansk Teknologisk Inst., Taastrup (Denmark); Esbensen Raadgivende Ingenioerer, Soenderborg (Denmark); Statens Byggeforskningsinstitut, Hoersholm (Denmark). Afd. for Energi og Indeklima. 1994. 43p. (In Danish). Contract ENS-1213/91-0010. Order Number DE95737563. Source: OSTI; NTIS.
EFP-91.

The purpose of this report is to summarize the Danish and foreign experience in daylighting in business buildings and to create appropriate technologies in order to improve the lighting, save energy and provide a better visual comfort in the existing and future buildings. In this connection the report deals with side-sources of light like atria, but not with roof-window lighting. Each topic is characterized by its present stage, trends and needs of the Danish research contribution. This report forms part of the project 'Energy optimization of business buildings - Utilization of the daylight and minimization of the electric lighting'. (EG) (87 refs.)

7986 (NYSERDA–94-19) **Energy use and domestic hot water consumption - Phase 1. Final report.** Goldner, F.S. (Energy Management & Research Associates, Brooklyn, NY (United States)). New York State Energy Research and Development Authority, New York, NY (United States); Energy Management and Research Associates, Brooklyn, NY (United States). Nov 1994. 64p. Sponsored by New York State Energy Research and Development Authority, Albany, NY (United States). Source: OSTI; New York State Energy Research and Development Authority, Two Rockefeller Plaza, Albany, NY 12223.

New York State Energy Research & Development Authority has sponsored a project to develop comprehensive operating data on combined domestic hot water (DHW) and heating systems to be used in system design and specifications. The new, more precise DHW flow data (broken down on a per capita basis) result in a better foundation for sizing decisions. Thirty New York City multifamily buildings with combined steam heating and DHW plants were instrumented to monitor apartment, outdoor, boiler and DHW temperatures, and burner on-off times. In nine buildings, which had been upgraded, additional data collected were: stack temperature, DHW flow in 15-minute increments, oil and boiler make-up water flows, and DHW temperature before and after the mixing valve and on the return line. The data set collected for 14 months amounts to a data base of over 110 megabytes. This report presents DHW demand patterns, seasonal variations, weekday vs. weekend consumption, consumption vs. occupancy levels, coincidence of 15-, 60-, 120-, and 180- minute demand periods, and average vs. peak demand levels, as well as figures for energy to generate DHW. The format of guidelines presented in this report differs from those currently in use. The "Low - Medium - High" (LMH) users set of guidelines provide a range, rather than a specific, singular gallonage standard. By providing LMH tables and guidelines for their application the design engineer or contractor can then use these as a tool from which to select the appropriate level that matches the site being served. Values are presented for both New York sizing guidelines (developed from this study), as well as a set of 'National' figures (derived from a compilation of studies conducted in other cities). The LMH approach and 'National' guidelines were adopted for inclusion in the 1995 ASHRAE Handbook revision.

7987 (ORNL–6805, pp. 87-91) **Possible future directions for extruded polystyrene foam insulation.** Abbott, J.G.; Minsker, J.H. Oak Ridge National Lab., TN (United States). [1994]. (CONF-9309409–: 1993 non-fluorocarbon insulation, refrigeration and air-conditioning technology workshop, Wiesbaden (Germany), 27-29 Sep 1993). In *Proceedings of the 1993 non-fluorocarbon insulation, refrigeration and air conditioning technology workshop.* 329p. Order Number DE94018333. Source: OSTI; NTIS.

Extruded polystyrene foam has been used as an insulation product for several decades. Over that time, the volume of product sold

and the number of manufacturers around the globe has increased dramatically. Because of the relatively high capital requirements for such a plant, the technology of extruded foam manufacture for boardstock, unlike many other foam types, has developed primarily through proprietary processes. This has limited the amount of information available regarding process details and future developments. Nonetheless, some general information is available.

7988 (ORNL–6805, pp. 93-99) **Swiss Eco Refrigerator Project.** Nipkow, J. (ARENA, Zuerich (Switzerland)). Oak Ridge National Lab., TN (United States). [1994]. (CONF-9309409–: 1993 non-fluorocarbon insulation, refrigeration and air-conditioning technology workshop, Wiesbaden (Germany), 27-29 Sep 1993). In *Proceedings of the 1993 non-fluorocarbon insulation, refrigeration and air conditioning technology workshop.* 329p. Order Number DE94018333. Source: OSTI; NTIS.

The Swiss "Eco Refrigerator" project was initiated by BUWAL and a group of experts who have been closely involved in the problem of CFCs for a long time. The project is sponsored by the Federal Office for Environment, Forests and Landscape (BUWAL). The project group comprises, besides BUWAL, the Energy Systems Laboratory of the Federal Institute of Technology (ETH), Zurich, the Laboratory for Thermodynamics and Refrigeration Technology of the New Buchs Technical College (NTB), and Greenpeace Switzerland. Project management is at IET energy consultants. The goal of the project is to develop and produce some refrigerator/freezer prototypes with respect to later series manufacturing, which should achieve better energy efficiency and reduced environmental impacts.

7989 (ORNL–6805, pp. 101-114) **The MBB-Vacuum Super Insulation (VSI).** Schilf, L. Oak Ridge National Lab., TN (United States). [1994]. (CONF-9309409–: 1993 non-fluorocarbon insulation, refrigeration and air-conditioning technology workshop, Wiesbaden (Germany), 27-29 Sep 1993). In *Proceedings of the 1993 non-fluorocarbon insulation, refrigeration and air conditioning technology workshop.* 329p. Order Number DE94018333. Source: OSTI; NTIS.

Vacuum Super Insulations represents the state of the art for very effective insulations for the purpose of thermal control of space crafts and also for specific terrestric applications like cryogenics. The principle of all of these vacuum super insulations is the following: To prevent for instance the solar radiation from a satellite structure heat shields of reflecting foils are used which are separated by filament nets.

7990 (ORNL–6805, pp. 115-119) **Development of evacuated panel thermal insulations.** Caps, R. (Bayerisches Zentrum fuer Angewandte Energieforschung e.V., Wuerzburg (Germany)); Fricke, J. Oak Ridge National Lab., TN (United States). [1994]. (CONF-9309409–: 1993 non-fluorocarbon insulation, refrigeration and air-conditioning technology workshop, Wiesbaden (Germany), 27-29 Sep 1993). In *Proceedings of the 1993 non-fluorocarbon insulation, refrigeration and air conditioning technology workshop.* 329p. Order Number DE94018333. Source: OSTI; NTIS.

Conventional insulations like rock wool or glass fiber boards have typical thermal conductivities in the range 0.03 W/mK to 0.04 W/mK. Insulations based on fumed silica like Microtherm^{R} have conductivities in air of > 0.02 W/mK. As they are rather expensive, however, they are mainly used for special applications at higher temperatures. Closed cell polyurethane foams, which are blown with environmentally hazardous CFC gases or their chlorine-free substitutes also have conductivities around 0.020 W/mK. Due to diffusion of atmospheric gases into and effusion of the blowing gases out of the closed cell polyurethane foam, this value increases with life time.

7991 (ORNL–6805, pp. 120-129) **Aerogels - a foam alternative.** Herrmann, G.H. (Colorants Research Lab., Ludwigshafen (Germany)); Mielke, M.F.; Ziegler, B.D.; Teich, F. Oak Ridge National Lab., TN (United States). [1994]. (CONF-9309409–: 1993 non-fluorocarbon insulation, refrigeration and air-conditioning technology workshop, Wiesbaden (Germany), 27-29 Sep 1993). In *Proceedings of the 1993 non-fluorocarbon insulation, refrigeration and air conditioning technology workshop.* 329p. Order Number DE94018333. Source: OSTI; NTIS.

Aerogels offer a thermal performance unattained by any other class of material. For a long time aerogels have been of little interest for big volume applications such as domestic appliances because of lack of availability, technical barriers and cheap energy prices. They have only become viable for some small scale specialist applications. However, during recent years BASF has successfully embarked on a program to build up a pilot production plant for granular inorganic aerogels (Basogel®) comprising amorphous SiO_2. So, an advanced thermal insulation material can be provided which seems to meet tough future performance and regulatory needs. Big scale industrial processing of the material has proven possible. Growing interest for application of aerogels in the home appliances manufacturers industry (boilers, refrigerators, freezers, ovens, etc.) may be expected, as excellent quality of aerogel fillings bring remarkable 20% improvement over conventional foamed insulation systems in terms of energy consumption. Additional optimization could be expected by application of vacuum techniques.

7992 (ORNL–6805, pp. 131-139) **Vacuum Insulation Panels (VIPs).** Reuter, R. (Degussa AG, Hanau (Germany)); Sextl, G. Oak Ridge National Lab., TN (United States). [1994]. (CONF-9309409–: 1993 non-fluorocarbon insulation, refrigeration and air-conditioning technology workshop, Wiesbaden (Germany), 27-29 Sep 1993). In *Proceedings of the 1993 non-fluorocarbon insulation, refrigeration and air conditioning technology workshop.* 329p. Order Number DE94018333. Source: OSTI; NTIS.

Degussa has developed silica based Vacuum Insulation Panels (VIPs) that, based on their low thermal conductivity makes it possible to create both non CFC and energy saving insulation materials.

7993 (ORNL–6805, pp. 141-151) **AURA™: A fiberglass based vacuum insulation panel technology.** McGrath, R.D. (Owens-Corning Fiberglas Science and Technology Center, Granville, OH (United States)). Oak Ridge National Lab., TN (United States). [1994]. (CONF-9309409–: 1993 non-fluorocarbon insulation, refrigeration and air-conditioning technology workshop, Wiesbaden (Germany), 27-29 Sep 1993). In *Proceedings of the 1993 non-fluorocarbon insulation, refrigeration and air conditioning technology workshop.* 329p. Order Number DE94018333. Source: OSTI; NTIS.

AURA insulation is an "evacuated panel insulation" that combines a thermally crafted FIBERGLASS media with a STAINLESS STEEL vacuum envelope to provide unsurpassed thermal insulating performance over a broad range of operating temperatures. The selection of the materials of construction in the first instance was made with full regard not just to the anticipated demands of the targeted applications, but also to the Environmental impact of the total insulating system. Working within those parameters, Owens-Corning's Research & Development effort was characterized by a pronounced bias towards an arrangement that would result in an insulation product with excellent longevity of performance (particularly retained thermal performance), ease of recyclability, durability, and a wide operating temperature band.

7994 (ORNL–6805, pp. 153-162) **Absorption technology.** Alefeld, G. (Bayerisches Zentrum fuer Angewandte Energieforschung e.V., Garching (Germany)); Demmel, S. Oak Ridge National Lab., TN (United States). [1994]. (CONF-9309409–: 1993 non-fluorocarbon insulation, refrigeration and air-conditioning technology workshop, Wiesbaden (Germany), 27-29 Sep 1993). In *Proceedings of the 1993 non-fluorocarbon insulation, refrigeration and air conditioning technology workshop.* 329p. Order Number DE94018333. Source: OSTI; NTIS.

The principles and state of the art for basic absorption cycles for chillers, air conditioners, ice makers, and heat pump applications are discussed. Absorption cycles provide for greater energy efficiency and reduced CO_2 emissions and is as efficient as compression technology. The technical issues that must be addressed are: efficiency, chillers must be usable as heat pumps in winter, chillers must be developed for district cooling applications, and corrosion inhibition. The economics and market and technology outlook for the absorption cycle are briefly discussed.

7995 (ORNL–6805, pp. 163-172) **Gas cooling - a worldwide overview.** Chapman, J.F.; Welsby, P.; Whitman, D.J. Oak

Ridge National Lab., TN (United States). [1994]. (CONF-9309409–: 1993 non-fluorocarbon insulation, refrigeration and air-conditioning technology workshop, Wiesbaden (Germany), 27-29 Sep 1993). In *Proceedings of the 1993 non-fluorocarbon insulation, refrigeration and air conditioning technology workshop.* 329p. Order Number DE94018333. Source: OSTI; NTIS.

Gas has only a small proportion of the air conditioning market worldwide. Cooling equipment is usually electrically powered, although environmentally superior gas alternatives are commercially available or under development. Economic factors in Japan have given gas over 25% of the air conditioning load. In Great Britain, Europe and the USA the market share is considerably lower, although the growth of demand for air conditioning and environmental pressures present market opportunities for gas. This paper reviews the world air conditioning market, current technologies, the environmental advantages of gas cooling, and the gas developments and research in progress.

7996 (ORNL–6805, pp. 173-184) **Cooling and air conditioning with water/zeolite.** Schwarz, J.; Maier-Laxhuber, P.; Woerz, R. Oak Ridge National Lab., TN (United States). [1994]. (CONF-9309409–: 1993 non-fluorocarbon insulation, refrigeration and air-conditioning technology workshop, Wiesbaden (Germany), 27-29 Sep 1993). In *Proceedings of the 1993 non-fluorocarbon insulation, refrigeration and air conditioning technology workshop.* 329p. Order Number DE94018333. Source: OSTI; NTIS.

The natural substances water and zeolite can be combined in an adsorption process for the concurrent production of heating and cooling power and for the efficient storage of thermal energy. Of the large variety of resulting engineering applications three well developed types are described in more detail. The three applications are: an electricity-independent icemaker for which only a small hand-operated vacuum pump is required; an automobile air conditioner which draws its power largely from the hot exhaust gases of the combustion engine and thus can serve to reduce the worldwide green-house effect; and a combination of electric water heater and refrigerator which does not draw additional power for the refrigeration part.

7997 (ORNL–6805, pp. 185-192) **Stirling cycle refrigerators and heat pumps.** Lundqvist, P.G. (Royal Institute of Technology, Stockholm (Sweden)). Oak Ridge National Lab., TN (United States). [1994]. (CONF-9309409–: 1993 non-fluorocarbon insulation, refrigeration and air-conditioning technology workshop, Wiesbaden (Germany), 27-29 Sep 1993). In *Proceedings of the 1993 non-fluorocarbon insulation, refrigeration and air conditioning technology workshop.* 329p. Order Number DE94018333. Source: OSTI; NTIS.

There are no Stirling machines, engines or refrigerators that operate according to the Ideal Stirling cycle. Still we name these machines after this cycle. The ideal cycle is of course named after the inventors Robert and James Stirling whose machines definitely did not worked according to the ideal cycle. The definition of what kind of machine that is worthy the name Stirling machine has been proposed by several authors.

7998 (ORNL–6805, pp. 193-197) **Thermoacoustic refrigeration and acoustic compression.** Hara, Toshitsugu (Nippon Institute of Technology (Japan)). Oak Ridge National Lab., TN (United States). [1994]. (CONF-9309409–: 1993 non-fluorocarbon insulation, refrigeration and air-conditioning technology workshop, Wiesbaden (Germany), 27-29 Sep 1993). In *Proceedings of the 1993 non-fluorocarbon insulation, refrigeration and air conditioning technology workshop.* 329p. Order Number DE94018333. Source: OSTI; NTIS.

Resonant high amplitude sound produces two significant phenomena; thermoacoustic refrigeration and sonic compression of gas. In this report, experimental studies on thermoacoustic refrigeration recently done in Japan were briefly shown, and a few discussions on acoustic compression refrigerator were also made. Few researchers in Japan have been interested in thermoacoustic refrigeration. Acoustic compressor is supposed not to have been experimented in Japan. Recently not a few designers of refrigeration are gradually interested in the results of experiments of both thermoacoustic refrigeration and acoustic compressors. When we can break through some problems (heat exchangers, valves, drivers and so on), their efficiencies will be expected to be equivalent to conventional compressors.

7999 (ORNL–6805, pp. 199-205) **Water as refrigerant and secondary refrigerant: Technologies for the production of chilled water and ice-slurries.** Paul, J. (Integral Technologie GmbH, Flensburg (Germany)). Oak Ridge National Lab., TN (United States). [1994]. (CONF-9309409–: 1993 non-fluorocarbon insulation, refrigeration and air-conditioning technology workshop, Wiesbaden (Germany), 27-29 Sep 1993). In *Proceedings of the 1993 non-fluorocarbon insulation, refrigeration and air conditioning technology workshop.* 329p. Order Number DE94018333. Source: OSTI; NTIS.

The increasingly intense discussion about future refrigerants is creating headaches for manufacturers of refrigeration equipment, installers and especially for end-users. Whatever decision is taken today, the result may prove to be wrong at a later stage. There is a threat to many substances and no-one can really forecast the eventual solution.

8000 (ORNL–6805, pp. 207-218) **Outdoor air and groundwater as natural sources for cooling.** Sorensen, S.N. Oak Ridge National Lab., TN (United States). [1994]. (CONF-9309409–: 1993 non-fluorocarbon insulation, refrigeration and air-conditioning technology workshop, Wiesbaden (Germany), 27-29 Sep 1993). In *Proceedings of the 1993 non-fluorocarbon insulation, refrigeration and air conditioning technology workshop.* 329p. Order Number DE94018333. Source: OSTI; NTIS.

The purpose of this paper is to discuss ideas and proposals for cooling without the use of refrigerants as CFC's by the utilization of the natural changes in outdoor air temperature during a day and the uniform temperature of groundwater during the year. The cooling methods mentioned in the paper can be used for air-conditioning, chillers and process cooling at moderate temperatures, but they can not be used to replace freezers and other cooling machinery with evaporation temperature below 0 deg. C. The use of alternative cooling sources as outdoor air and groundwater means at the same time a reduction in the use of refrigerants and a reduction in the electricity consumption in comparison to cooling compressors. As a consequence of the reduction in electricity consumption there will be a reduction in CO_2-emission to the atmosphere in case of power production based on fossil fuels.

8001 (ORNL–6805, pp. 219-224) **High density energy storage for desiccant cooling systems.** Laevemann, E. (Ludwig-Maximilians-Universitaet Muenchen (Germany)); KeBling, W. Oak Ridge National Lab., TN (United States). [1994]. (CONF-9309409–: 1993 non-fluorocarbon insulation, refrigeration and air-conditioning technology workshop, Wiesbaden (Germany), 27-29 Sep 1993). In *Proceedings of the 1993 non-fluorocarbon insulation, refrigeration and air conditioning technology workshop.* 329p. Order Number DE94018333. Source: OSTI; NTIS.

The objective of our development is an open cycle liquid desiccant cooling system designed to provide cooling and dehumidification for air conditioning purposes as well as efficient energy storage within the desiccant (up to 1000 MJ/m^3 of diluted solution). A schematic of the system is shown. Ambient air is dehumidified in a sorption reactor by a concentrated hygroscopic salt solution, e.g., Klimat 3930 or LiCL-H_2O, supplied from a plastic storage tank. The heat of absorption is transferred to a cooling tower by a cooling water loop to achieve an almost isothermal absorption process, required for optimal air dehumidification and optimal energy storage capacity. The salt solution is diluted in the absorption process and pumped to a second tank. The dehumidified air is mixed with indoor air of state, cooled in an indirect evaporative cooler and supplied to the room. A part of the air flow is humidified in contact with a wet heat exchanger surface and provides indirect evaporative cooling. The exhaust air temperature and dewpoint are close to room temperature. A separate operation mode or a separate sorption reactor is used to reconcentrate the salt solution. The heat for regeneration can be supplied via a heating water loop by any heat source of about 65°C or higher.

8002 (ORNL–6805, pp. 263-276) **CFC- and FHC-free refrigerators by FORON Hausgeraete Co. - a breakthrough in household refrigeration.** Meyer, A. Oak Ridge National Lab., TN

(United States). [1994]. (CONF-9309409–: 1993 non-fluorocarbon insulation, refrigeration and air-conditioning technology workshop, Wiesbaden (Germany), 27-29 Sep 1993). In *Proceedings of the 1993 non-fluorocarbon insulation, refrigeration and air conditioning technology workshop.* 329p. Order Number DE94018333. Source: OSTI; NTIS.

Considering the proposed CFC-ban according to the Montreal Protocol, the surge for alternative substances as refrigerants and foaming agents worldwide was begun. Though many companies preferred to use FHC 134a, despite the fact that it is accelerating the "greenhouse effect," FORON chose to use hydrocarbons as an environment saving alternative. The results of extensive tests over many years proved that these natural gases have obvious energy advantages, that their use in the mass production process is rather uncomplicated, and that the security problems concerning inflammable gases can be successfully solved. Since the starting serial production in mid-March over 60,000 completely CFC/FHC-free refrigerators were produced and sold mainly in Germany. Further development work on the improvement of the technology is under way.

8003 (ORNL–6805, pp. 277-288) **The conversion of German household-appliance refrigeration industry from CFC's to hydrocarbons and fluorocarbons in 1993.** Lotz, H. Oak Ridge National Lab., TN (United States). [1994]. (CONF-9309409–: 1993 non-fluorocarbon insulation, refrigeration and air-conditioning technology workshop, Wiesbaden (Germany), 27-29 Sep 1993). In *Proceedings of the 1993 non-fluorocarbon insulation, refrigeration and air conditioning technology workshop.* 329p. Order Number DE94018333. Source: OSTI; NTIS.

On a mass production scale the only substitute for refrigerants usable at the present time is the fluorohydrocarbon R 134a. Secured experience is available from several years of trial use under extreme conditions. R 134a is available on the market in sufficient quantity and purity and so are the ester oils necessary for compressor lubrication. The refrigerant has as well known no depletion effect on the ozone layer and directly contributes a multiple less to the global warming than the CFC 12 to replace. The result being a visibly diminished TEWI greenhouse effect, which reflects the global atmosphere pollution including the direct greenhouse effect produced by the worst-case total emission of refrigerant and insulation blowing agent without recycling and the indirect greenhouse effect as emission of CO_2 in fossil fuel power stations, resulting of the energy consumption of an appliance. As an example the phase-in-step to the CFC-free technology in August 1993 reveals for the fleet-emission of BOSCH-SIEMENS refrigerators/freezers a TEWI-reduction by 40%.

8004 (ORNL–6805, pp. 289-295) **Flammable refrigerants in household refrigerators.** Juergensen, H. (AEG Hausgeraete AG, Kassel (Germany)). Oak Ridge National Lab., TN (United States). [1994]. (CONF-9309409–: 1993 non-fluorocarbon insulation, refrigeration and air-conditioning technology workshop, Wiesbaden (Germany), 27-29 Sep 1993). In *Proceedings of the 1993 non-fluorocarbon insulation, refrigeration and air conditioning technology workshop.* 329p. Order Number DE94018333. Source: OSTI; NTIS.

Flammable refrigerants have been in the discussion for the phase out of CFC from the beginning. R 152a was one of the candidates, but propane and other hydrocarbons (HC) seemed to work too. The main discussion point was the flammability risk. On the basis of some risc studies in 1988 to 1990 the home appliance manufacturers decided not to take R 152a or other flammables, in USA, Western and Eastern Germany.

8005 (ORNL–6805, pp. 297-317) **Air cycle air conditioning and the use of ammonia in supermarket refrigeration systems.** Hesse, U. (Universitaet Hannover (Germany)). Oak Ridge National Lab., TN (United States). [1994]. (CONF-9309409–: 1993 non-fluorocarbon insulation, refrigeration and air-conditioning technology workshop, Wiesbaden (Germany), 27-29 Sep 1993). In *Proceedings of the 1993 non-fluorocarbon insulation, refrigeration and air conditioning technology workshop.* 329p. Order Number DE94018333. Source: OSTI; NTIS.

The feasibility of using ammonia as a refrigerant in commercial refrigerators is discussed. The cycle modifications necessary for the use of ammonia refrigerants are outlined. The technical results obtained and the problems yet to be solved are: automatic oil return and the use of ammonia; thermosyphon refrigeration circuit in evaporator/liquid separator circuit; application of safety rules VGB20 (Germany) to the safety concept for the place of installation (in case of breakdown); and inclusion of refrigerant-cooled oil cooler in plants with air-cooled condensor or evaporative condenser. The economics and technical outlook for a new generation of NH_3 chillers are outlined.

8006 (ORNL–6805, pp. 318-328) **Natures refrigerant - propane.** James, R.W. (South Bank Univ., London (United Kingdom)); Missenden, J.F. Oak Ridge National Lab., TN (United States). [1994]. (CONF-9309409–: 1993 non-fluorocarbon insulation, refrigeration and air-conditioning technology workshop, Wiesbaden (Germany), 27-29 Sep 1993). In *Proceedings of the 1993 non-fluorocarbon insulation, refrigeration and air conditioning technology workshop.* 329p. Order Number DE94018333. Source: OSTI; NTIS.

The advantages of using propane for refrigeration systems are examined; these relate to energy efficiency, compressor lubrication, availability, costs, environmental factors and safety. It is concluded that propane is an attractive and environmentally-friendly refrigerant for small systems.

8007 (PNL–10121) **Comparison of current state residential energy codes with the 1992 model energy code for one- and two-family dwellings; 1994.** Klevgard, L.A.; Taylor, Z.T.; Lucas, R.G. Pacific Northwest Lab., Richland, WA (United States). Jan 1995. 182p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. Order Number DE95007015. Source: OSTI; NTIS; GPO Dep.

This report is one in a series of documents describing research activities in support of the US Department of Energy (DOE) Building Energy Codes Program. The Pacific Northwest Laboratory (PNL) leads the program for DOE. The goal of the program is to develop and support the adopting, implementation, and enforcement of Federal, State, and Local energy codes for new buildings. The program approach to meeting the goal is to initiate and manage individual research and standards and guidelines development efforts that are planned and conducted in cooperation with representatives from throughout the buildings community. Projects under way involve practicing architects and engineers, professional societies and code organizations, industry representatives, and researchers from the private sector and national laboratories. Research results and technical justifications for standards criteria are provided to standards development and model code organizations and to Federal, State, and local jurisdictions as a basis to update their codes and standards. This effort helps to ensure that building standards incorporate the latest research results to achieve maximum energy savings in new buildings, yet remain responsive to the needs of the affected professions, organizations, and jurisdictions. Also supported are the implementation, deployment, and use of energy-efficient codes and standards. This report documents findings from an analysis conducted by PNL of the State's building codes to determine if the codes meet or exceed the 1992 MEC energy efficiency requirements (CABO 1992a).

8008 (PNL–10387) **Differences between the 1992 and 1993 CABO Model Energy Codes.** Conover, D.R.; Lucas, R.G. Pacific Northwest Lab., Richland, WA (United States). Jan 1995. 16p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. Order Number DE95006488. Source: OSTI; NTIS; GPO Dep.

This report is one in a series of documents describing research activities in support of the US Department of Energy (DOE) Building Energy Standards Program. The Pacific Northwest Laboratory (PNL) leads the program for DOE. The goal of the Program is to develop and encourage the implementation Of Performance standards to achieve the maximum practicable energy efficiency in the design of new buildings. The program approach to meeting the goal is to initiate and manage individual research and standards and guidelines development efforts that are planned and conducted in cooperation with representatives from throughout the buildings community. Projects under way involve practicing architects and engineers, Professional societies and code organizations, industry

representatives, and researchers from the private sector and national laboratories. Research results and technical justifications for standards criteria are provided to standards development and model code organizations and to Federal, State, and local jurisdictions as a basis to update their codes and standards. This effort helps to ensure that building standards incorporate the latest research results to achieve maximum energy savings in new buildings, Yet remain responsive to the needs of the affected professions, organizations, and jurisdictions. Our efforts also support the implementation, deployment, and use of energy-efficient codes and standards. This report identifies the differences between the 1992 and 1993 editions of the Council of American Building Officials, (CABO) Model Energy Code (MEC) and briefly highlights the technical and administrative impacts of these changes.

8009 (SEI-EED–37) **Household energy and nutrition. A study of low-income households in Lusaka.** Chiw, P. (Department of Energy (Zambia)); Muchelemba, J.B.; Siamwiza, R.J.; Ellegaard, A. Stockholm Environment Inst. (Sweden). 1994. 56p. Order Number DE95737665. Source: OSTI; NTIS.

This study was conducted to investigate and provide empirical evidence on energy scarcity and its possible implications on the well-being of the family. A primary aim was to find out if people perceive a household fuel scarcity. Another aim was to determine whether such a scarcity could be expected to affect the nutrition or well-being of the family. Since women are generally responsible for the life-preserving activities in the household, women in low-income families in Lusaka formed the target group. Charcoal is the main source of energy for cooking for the majority of the urban middle and low income families. It is also the main fuel used for heating water for bathing. Over 90% of the population in the study area used charcoal for cooking. People use charcoal primarily it is readily available. It is the men who are mostly responsible for purchasing the charcoal, as for most of the other household purchases. No household fuel scarcity was evidenced. On the contrary, the vast majority of the respondents (95%) did not consider charcoal expensive compared to other household expenditures like food, housing, clothing, etc. Charcoal was found to represent only a small fraction of household expenditure on food items. It is concluded that energy expenditure is not a major issue in the household economy. Requirements appear to be met. Charcoal prices in real terms have been stable or even declining over the part period. Expenditure on energy is in fact so small compared to other household expenditures that a further reduction (if possible) would not greatly improve the household nutrition situation. While the present energy situation does not force people to undertake measures that threaten their health or well-being, it is clear that more energy could be used in order to improve it, for instance by boiling drinking water. 35 refs, 4 figs, 18 tabs

3202 Transportation

Refer also to citation(s) 7996

8010 (ANL/ES/CP–84328) **Transportation technology transitions and macroeconomic growth – Contemporary evidence.** Santini, D.J. Argonne National Lab., IL (United States). [1994]. 87p. Sponsored by USDOE, Washington, DC (United States);Japan Automobile Research Inst., Tokyo (Japan). DOE Contract W-31109-ENG-38. (ANL/ES/VU–84328; CONF-9411164–1: International workshop on the motor vehicle and the global environment problem, Tokyo (Japan), 2 Nov 1994). Order Number DE95004617. Source: OSTI; NTIS; GPO Dep.

Viewgraphs are included with this paper.

This paper presents international and temporal extensions of evidence for a theory developed by the author concerning the interaction of transportation technology transitions and macroeconomic growth. The period 1970 to the present is examined for the nations of Japan, the US, and Europe (France, Germany, Italy and the United Kingdom collectively). An addition to the abstract logic supporting the general arguments of the theory is also presented. The theory has been developed concerning the role of significant transportation technology transitions as a cause of significant macroeconomic declines in nations for which the manufacture of transportation vehicles (ships, locomotives, and automobiles) is a dominant economic activity. The theory offers an explanation for periods of pronounced multiyear decline in economic growth rate–sometimes called depressions and sometimes called stagnations. One purpose of this paper is to explore whether or not Japan and Europe have each recently experienced a multiyear event of this type. In the theory and the evidence presented for it, environmental regulation of transportation vehicles has been shown to be an initiating cause of significant technical change, with sharp, sustained fuel price increases being a second frequent initiating cause. These causes of significant technical change, and their possible consequences, are potentially important considerations for those proposing policies to deal with global warming, since both fuel economy regulation and fuel price increases have been recommended by policy analysts as means to reduce transportation's contribution to global warming. The theory has been offered and supported by publications developing mathematical models and examining US historical evidence consistent with the theory.

8011 (DOE/EIA–0585(93)) **Alternatives to traditional transportation fuels 1993.** USDOE Energy Information Administration, Washington, DC (United States). Office of Coal, Nuclear, Electric and Alternate Fuels. Jan 1995. 90p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95005445. Source: OSTI; NTIS; GPO; GPO Dep.

In recent years, gasoline and diesel fuel have accounted for about 80 percent of total transportation fuel and nearly all of the fuel used in on-road vehicles. Growing concerns about the environmental effects of fossil fuel use and the Nation's high level of dependence on foreign oil are providing impetus for the development of replacements or alternatives for these traditional transportation fuels. (The Energy Policy Act of 1992 definitions of "replacement" and "alternative" fuels are presented in the following box.) The Alternative Motor Fuels Act of 1988, the Clean Air Act Amendments of 1990 (CAAA90) and the Energy Policy Act of 1992 (EPACT) are significant legislative forces behind the growth of replacement fuel use. Alternatives to Traditional Transportation Fuels 1993 provides the number of on-road alternative fueled vehicles in use in the United States, alternative and replacement fuel consumption, and information on greenhouse gas emissions resulting from the production, delivery, and use of replacement fuels for 1992, 1993, and 1995.

8012 (KE–93007G) **Study on the CNG storage method using activated adsorbent and CNG combustion technology for vehicles.** Kwon, C.H. (Korea Institute of Energy Research, Taejon (Korea, Republic of)); Kim, J.P.; Ko, C.J.; Lee, Y.J.; Kim, B.S.; Kwon, O.S. No corporate text available. Dec 1993. 139p. (In Korean). Order Number DE95744293. Source: OSTI; NTIS (US Sales Only).

In this investigation, we investigate reaction mechanisms on storage system for natural gas in activated adsorbent and found some problems in applying natural gas for vehicles. In addition, we suggest directions for future researches on CNG storage system. In order to construct a data base for divided combustion chamber type lean burn gas engine, we have simply designed a prototype for a divided combustion chamber. Combustion characteristics on the influences by the geometric configuration of a passagehole and equivalence ratio of main and sub chamber have been experimentally examined under the condition of constant volumetric ratio in main-sub combustion chamber in a constant volumetric combustion chamber.

8013 (KE–93012G) **Study on classification of fuel consumption for waggon and jeep and comparison of CVS-75 mode and on-road fuel economy.** Ko, C.J. (Korea Institute of Energy Research, Taejon (Korea, Republic of)); Lee, Y.J.; Kwon, C.H.; Kim, B.S.; Kim, J.P.; Kwon, O.S. No corporate text available. Dec 1993. 118p. (In Korean). Order Number DE95744294. Source: OSTI; NTIS (US Sales Only).

The classification standard of fuel economy for the domestic waggon and jeep was established. For compare CVS-75 fuel economy with in-use fuel economy, review on the fuel consumption measuring mode, CVS-75 mode, which authorized by government and made a survey of the traffic characteristic in Seoul metropolitan. As a result, it was showed that CVS-75 fuel economy should be modified by adjustment factor. (author). refs., figs., tabs.

8014 (KFB–94-9) **Emission and energy evaluation principles for transport systems.** Flodstroem, E. (MariTerm AB, Goeteborg (Sweden)); Sjoebris, A. Swedish Transport and Communications Research Board, Stockholm (Sweden). Sep 1994. 74p. (In Swedish). Order Number DE95737686. Source: OSTI; NTIS.

As environmental issues are gaining in importance, the use of energy and emission factors is becoming more frequent in research, investigations etc. The purpose of the factors is to show how energy- and environment-effective the transports are and they are often used for comparisons between different transport modes. The aim of the report is to propose calculation principles that give correct comparisons. The transport work of the transport mode is commonly used as a measure of its performance. The report presents suggestions for corrections with respect to the utilization of the transport mode (volume goods) and differences in real transport distance. Suggested calculation bases build on the principles of high utilization and shortest transport distance respectively. For combined transport modes, such as ferries combining passengers and cargo, a special method for dividing energy consumption and exhaust gas emissions has been designed. Suggested methods have been designed in such a way that available transport statistics can be used. 15 refs., 9 figs., 22 tabs

8015 (ORNL–6805, pp. 225-249) **A CO_2 vapour compression system for vehicle air conditioning.** Pettersen, J. (Norwegian Institute of Technology, Trondheim (Norway)). Oak Ridge National Lab., TN (United States). [1994]. (CONF-9309409–: 1993 non-fluorocarbon insulation, refrigeration and air-conditioning technology workshop, Wiesbaden (Germany), 27-29 Sep 1993). In *Proceedings of the 1993 non-fluorocarbon insulation, refrigeration and air conditioning technology workshop.* 329p. Order Number DE94018333. Source: OSTI; NTIS.

A new, efficient and environmentally benign automobile air conditioning system "MAC-2000" has been developed at The Norwegian Institute of Technology, in cooperation with Hydro Aluminum. The new system is based on a vapour compression cycle with carbon dioxide as the refrigerant. Although working pressures and component design are different, the basic principle of the CO_2 system is similar to present CFC/HFC units. By development and testing of a laboratory prototype, it has been documented that the CO_2 system is highly competitive to present CFC-12 and HFC-134a units in terms of performance, cost, weight and dimensions. The new concept thus offers a complete solution to the environmental problems associated with motorcar air conditioning, and eliminates all uncertainty with respect to possible unforeseen effects from new refrigerant compounds. Further advantages of the natural fluid CO_2 as a refrigerant are: No need for recycling or recovery, low cost of fluid, excellent availability, well-known properties, and more compact machinery and components.

8016 (ORNL–6805, pp. 251-261) **Application of "natural" refrigerants: New system concepts for the use of CO_2.** Lorentzen, G. (NTH, Trondheim (Norway)). Oak Ridge National Lab., TN (United States). [1994]. (CONF-9309409–: 1993 non-fluorocarbon insulation, refrigeration and air-conditioning technology workshop, Wiesbaden (Germany), 27-29 Sep 1993). In *Proceedings of the 1993 non-fluorocarbon insulation, refrigeration and air conditioning technology workshop.* 329p. Order Number DE94018333. Source: OSTI; NTIS.

A good half century ago the "freons" were introduced with a massive advertising campaign. The main arguments put forward in their favour were complete safety and harmlessness to the environment. Both of these claims have been proved wrong. Many accidents have occurred due to suffocation in the heavy gas, without warning, in below threshold spaces. Today the CFC's are being banned worldwide as a result of their alleged effect on the ozone layer. At the Copenhagen meeting recently it was decided that the HCFC's must be controlled too. This is by no means a unique experience. Similar predicaments have occurred by release to the environment of many other new chemicals. The extensive use of ever new compounds is one of the big problems of our time. In this situation it does not seem very sensible to replace the CFC/HCFC's with a new family of related hydrocarbons, equally foreign to nature, to be used in quantities of hundred thousand's of tons every year. In principle it must be a much better solution to use naturally occurring substances as refrigerants, compounds already circulating in quantity in the biosphere and which we know are harmless. Examples can be water, air, carbon dioxide, ammonia, hydrocarbons, nitrogen or the noble gases. Some of them are already in the focus for extended use in the future, in particular air, ammonia and propane. In the following it will be shown how the "old" refrigerant CO_2, which has been completely abandoned during the last 40 years, can be used to advantage in new and properly designed systems.

8017 (ORNL–6828) **Transportation Energy Efficiency Trends, 1972–1992.** Greene, D.L. (Oak Ridge National Lab., TN (United States)); Fan, Y. Oak Ridge National Lab., TN (United States). Dec 1994. 106p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE95005001. Source: OSTI; NTIS; GPO Dep.

The US transportation sector, which remains 97% dependent on petroleum, used a record 22.8 quads of energy in 1993. Though growing much more slowly than the economy from 1975 to 1985, energy use for transportation is now growing at nearly the same rate as GDP. This report describes the analysis of trends in energy use and energy intensity in transportation into components due to, (1) growth in transportation activity, (2) changes in energy intensity, and (3) changes in the modal structure of transportation activities.

3203 Industrial and Agricultural Processes

Refer also to citation(s) 7168, 7172, 7258, 7263, 7408, 7491, 7535, 7542, 7552, 7987, 7989, 8041, 8056, 8311

8018 (DOE/BP–1958) **Description of electric energy use in commercial buildings in the Pacific Northwest: 1992 Supplement. End-use Load and Consumer Assessment Program (ELCAP).** Taylor, Z.T. Pacific Northwest Lab., Richland, WA (United States). Jul 1992. 136p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. Order Number DE95004894. Source: OSTI; NTIS; GPO Dep.

In December, 1989 Bonneville published Description of Electric Energy Use in Commercial Buildings in the Pacific Northwest, a summary report on the data collected from commercial buildings metered under the End-Use Load and Consumer Assessment Program (ELCAP), for the period 1986 through 1988. Average monthly and annual electric end-use intensities (EUIs, kWh/ft^2) and average load shapes were presented for nine building types and seven or eight end uses, as well as building totals. This document is a supplement to that report. An additional two and one-half years' data (October 1988 through June 1991) have been collected since the original report, resulting in increased numbers of buildings available for analysis. Additionally, some analytical techniques used in the previous report have been improved and some minor bugs corrected. This supplement differs from the original in the following ways: increased sample sizes; improved analytical techniques; corrected aggregation techniques; eliminated building types; eliminated split plots; included Btu/square foot.

8019 (DOE/BP–2457) **Final report, exhaust air heat pump monitoring study.** Koca, R. (Pacific Science and Technology, Inc., Bend, OR (United States)); Swanson, D.; Dent, C. Idaho Dept. of Water Resources, Boise, ID (United States); Pacific Science and Technology, Inc., Bend, OR (United States). Jul 1994. 150p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FC79-82BP34625. Contract IDWR-92-03-82-902-41. Order Number DE95004888. Source: OSTI; NTIS; GPO Dep.

A demonstration and research study of exhaust air heat pumps was conducted by the Energy Division of the Idaho Department of Water Resources and Bonneville Power Administration to determine the electrical energy savings available with that technology. Pacific Science and Technology, Inc. (PS&T) was contracted to specify and install metering equipment, collect monthly data, perform analysis, and report results including monthly summaries and a comprehensive final report. Thirty-one exhaust air heat pump (EAHP) water heaters, installed in new Super Good Cents homes in Idaho and Washington, were monitored in detail so that performance and savings values could be determined. Up to 13 months of data were obtained from the sites via postcards that occupants filled out monthly. The coefficient of performance (COP) of the

EAHP units averaged 2.0 (0.3 standard deviation) for all sites. No significant difference in COP was noted between the Idaho and Washington sites. The savings averaged 183 kWh per month or 2200 kWh per year. This corresponds to an annual savings of $110 at a rate of $0.05 per kWh. The average installed cost after subtracting avoided costs was $1800. A simple payback for the unit, therefore, is 16.4 years. Blower door and perfluorocarbon tracer (PFT) gas tests were performed at most sites. The blower door test was a one-time measurement which provided an estimate of natural ventilation rates. The PFT tests lasted for 16 days on average, and accounted for all actual ventilation during the test period, whether natural or mechanically induced. The average natural infiltration rate as measured with the blower door was 0.37 air changes per hour (ACH). For comparison purposes, the blower door data was also adjusted to account for the average weather conditions normally observed during the month in which the PFT test was performed.

8020 (DOE/ER/13676–7) **A general procedure for the synthesis of process flowsheets. Final report, July 16, 1991–July 31, 1993.** Douglas, J.M.; Malone, M.F. Massachusetts Univ., Amherst, MA (United States). Dept. of Chemical Engineering. Dec 1994. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-87ER13676. Order Number DE95005668. Source: OSTI; NTIS; GPO Dep.

The research was divided into two parts: examining (1) continuous and (2) batch processes. The work on continuous processes was focused on the development of a more general procedure for the systematic synthesis of process flowsheets that identifies the most important process alternatives (including waste minimization alternatives), the dominant design variables, and the minimum energy consumption for each alternative for continuous, vapor-liquid-liquid-solid processes for the production of nonpolymeric materials. The work was an extension of the hierarchical synthesis procedure previously developed for vapor-liquid processes. A new superstructure for continuous process flowsheets, along with an extended set of rules for the classification of components, with special attention to waste minimization, and solvent selection was developed. The work on batch processes was focused on the development of new procedures for the design and scheduling of multiproduct batch plants. The approach was based on simulated annealing and the solution of the optimal sequencing problem as well as the results on the design problem are described in this report.

8021 (DOE/ER/40888–T1) **A feasibility study for a manufacturing technology deployment center.** Texas Univ., Arlington, TX (United States). 31 Oct 1994. 107p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG05-94ER40888. Order Number DE95004373. Source: OSTI; NTIS; GPO Dep.

The Automation & Robotics Research Institute (ARRI) and the Texas Engineering Extension Service (TEEX) were funded by the U.S. Department of Energy to determine the feasibility of a regional industrial technology institute to be located at the Superconducting Super Collider (SSC) Central Facility in Waxahachie, Texas. In response to this opportunity, ARRI and TEEX teamed with the DOE Kansas City Plant (managed by Allied Signal, Inc.), Los Alamos National Laboratory (managed by the University of California), Vought Aircraft Company, National Center for Manufacturing Sciences (NCMS), SSC Laboratory, KPMG Peat Marwick, Dallas County Community College, Navarro Community College, Texas Department of Commerce (TDOC), Texas Manufacturing Assistance Center (TMAC), Oklahoma Center for the Advancement of Science and Technology, Arkansas Science and Technology Authority, Louisiana Productivity Center, and the NASA Mid-Continent Technology Transfer Center (MCTTC) to develop a series of options, perform the feasibility analysis and secure industrial reviews of the selected concepts. The final report for this study is presented in three sections: Executive Summary, Business Plan, and Technical Plan. The results from the analysis of the proposed concept support the recommendation of creating a regional technology alliance formed by the states of Texas, New Mexico, Oklahoma, Arkansas and Louisiana through the conversion of the SSC Central facility into a Manufacturing Technology Deployment Center (MTDC).

8022 (DOE/ID/12772–3) **Enhanced boiling heat transfer in horizontal test bundles.** Trewin, R.R.; Jensen, M.K.; Bergles, A.E. Rensselaer Polytechnic Inst., Troy, NY (United States). Aug 1994. 292p. Sponsored by USDOE, Washington, DC (United States);Clark and Crossan Endowed Chair (United States). DOE Contract FC07-88ID12772. Order Number DE94017504. Source: OSTI; NTIS; GPO Dep.

Two-phase flow boiling from bundles of horizontal tubes with smooth and enhanced surfaces has been investigated. Experiments were conducted in pure refrigerant R-113, pure R-11, and mixtures of R-11 and R-113 of approximately 25, 50, and 75% of R-113 by mass. Tests were conducted in two staggered tube bundles consisting of fifteen rows and five columns laid out in equilateral triangular arrays with pitch-to-diameter ratios of 1.17 and 1.5. The enhanced surfaces tested included a knurled surface (Wolverine's Turbo-B) and a porous surface (Linde's High Flux). Pool boiling tests were conducted for each surface so that reference values of the heat transfer coefficient could be obtained. Boiling heat transfer experiments in the tube bundles were conducted at pressures of 2 and 6 bar, heat flux values from 5 to 80 kW/m^2s, and qualities from 0% to 80%, Values of the heat transfer coefficients for the enhanced surfaces were significantly larger than for the smooth tubes and were comparable to the values obtained in pool boiling. It was found that the performance of the enhanced tubes could be predicted using the pool boiling results. The degradation in the smooth tube heat transfer coefficients obtained in fluid mixtures was found to depend on the difference between the molar concentration in the liquid and vapor.

8023 (DOE/ID/12833–1) **Oxygen enriched combustion system performance study. Phase 2: 100 percent oxygen enriched combustion in regenerative glass melters, Final report.** Tuson, G.B.; Kobayashi, H.; Campbell, M.J. Praxair, Inc., Tarrytown, NY (United States). Aug 1994. 124p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FC07-88ID12833. Order Number DE95004212. Source: OSTI; NTIS; GPO Dep.

The field test project described in this report was conducted to evaluate the energy and environmental performance of 100% oxygen enriched combustion (100% OEC) in regenerative glass melters. Additional objectives were to determine other impacts of 100% OEC on melter operation and glass quality, and to verify on a commercial scale that an on-site Pressure Swing Adsorption oxygen plant can reliably supply oxygen for glass melting with low electrical power consumption. The tests constituted Phase 2 of a cooperative project between the United States Department of Energy, and Praxair, Inc. Phase 1 of the project involved market and technical feasibility assessments of oxygen enriched combustion for a range of high temperature industrial heating applications. An assessment of oxygen supply options for these applications was also performed during Phase 1, which included performance evaluation of a pilot scale 1 ton per day PSA oxygen plant. Two regenerative container glass melters were converted to 100% OEC operation and served as host sites for Phase 2. A 75 ton per day end-fired melter at Carr-Lowrey Glass Company in Baltimore, Maryland, was temporarily converted to 100% OEC in mid- 1990. A 350 tpd cross-fired melter at Gallo Glass Company in Modesto, California was rebuilt for permanent commercial operation with 100% OEC in mid-1991. Initially, both of these melters were supplied with oxygen from liquid storage. Subsequently, in late 1992, a Pressure Swing Adsorption oxygen plant was installed at Gallo to supply oxygen for 100% OEC glass melting. The particular PSA plant design used at Gallo achieves maximum efficiency by cycling the adsorbent beds between pressurized and evacuated states, and is therefore referred to as a Vacuum/Pressure Swing Adsorption (VPSA) plant.

8024 (DOE/ID/13001–1) **Advanced heat pump for recovery of volatile organic compounds, Phase III - demonstration of BCSRHP mobile regenerator. Final report.** Nuclear Consulting Services, Inc., Columbus, OH (United States). 1 Nov 1994. 244p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FC02-90ID13001. (NUCON–05DE300/02). Order Number DE95004438. Source: OSTI; NTIS; GPO Dep.

Under Phase I of the subject contract, feasibility studies and basic engineering studies were performed for a Brayton Cycle Solvent Recovery Heat Pump (BCSRBP) system to prevent pollution from

small source emitters. It was determined that the cost of a complete system, including adsorbers and regeneration process, would be far too much for the small emission source in most cases. This "integrated" approach was therefore not feasible. However, it was concluded that the expensive portion of the Brayton cycle process, the regenerator, could be shared by mounting it on a trailer that could be transported to different sites to regenerate an adsorber. Under Phase II of the project a mobile regenerator (BCSRI-IP) was designed and built to serve a large number of sites. Adsorbers were designed to control emissions for a week or more between regenerations. The purpose of phase III was to demonstrate the cost effectiveness and efficiency of the shared (decoupled) BRAYSORB® solvent recovery system in energy use and emission control compared to other control technologies through a performance testing program at representative industrial and commercial host sites in Southern California. NUCON was the prime contractor for the demonstration portion of this project. Support and funding were received from Southern California Edison Company, South Coast Air Quality Management District, and the U.S. Department of Energy in addition to the contribution by NUCON. Contractual arrangements were completed with each of the host sites and permits for both the stationary and mobile equipment were acquired. The adsorbers were installed at each host site and the appropriate interface connections were made. The mobile regenerator was transported to Southern California for the demonstration.

8025 (DOE/R6/99203–T8) **[DELTA T dryer/moisture control system]. Final technical report.** Drying Technology, Inc., Silsbee, TX (United States). [1995]. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG46-92R699203. Order Number DE95005115. Source: OSTI; NTIS; GPO Dep.

Drying Technology, Inc. was awarded a grant for the purpose of extending DELTA T dryer/moisture control technology into additional industries. Ultimate purpose of the grant was to save energy and improve efficiency in the process industries. Results indicate that these objectives have been met and will continue as this new technology is duplicated in the present industries and also is extended into other industries as well.

8026 (KE–93024G) **Development of the software for energy savings in chemical processes(I).** Cho, S.C. (Korea Institute of Energy Research, Taejon (Korea, Republic of)); Seong, J.S.; Kim, K.I. No corporate text available. Dec 1993. 159p. (In Korean). Order Number DE95744280. Source: OSTI; NTIS (US Sales Only).

Energy conservation in the energy intensive chemical industries, especially in the thermal separation processes is the most effective way for saving industrial energy. The purpose of this project is to research the methods of energy savings in the thermal separation processes and to develop a software for selecting and applying these method. This report is the first term report of the project. The methods of energy savings in distillation processes are investigated and a systematic and effective algorithm for selecting and applying the methods of energy savings in distillation processes is developed. In the next year(second term), a computer program with this algorithm is developed for applying it to real plant. It is expected that about 20% of distillation energy will be saved by application of above methods. The results are as followes. (1). Energy savings in distillation processes can be performed with following techniques; (1) feed optimization (2) doing a good insulation equipment and pipings, (3) setting the product purity by process optimization (4) choice of appropriate control scheme and application of advanced control system, (5) optimum combination of columns by pinch technology, (6) revamping with high efficient distillation columns, (7) utilization of distillate heat of condensing using heat pump, and (8) augment distillation with adsorption, membranes, or other processes to form hybrid system. (2). A systematic and effective algorithm for selecting and applying the methods of energy saving in distillation processes is developed. (author). refs., figs., tabs.

8027 (LBL–36395) **Industrial sector energy conservation programs in the People's Republic of China during the seventh five-year plan (1986–1990).** Liu Zhiping (State Planning Commission, Beijing (China). Energy Research Inst.); Sinton, J.E.; Yang Fuqiang; Levine, M.D.; Ting, M.K. Lawrence Berkeley Lab., CA (United States). Sep 1994. 56p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00098. Order Number DE95006721. Source: OSTI; NTIS; GPO Dep.

The impetus at the national level to invest in energy conservation is quite strong and has long been reflected not only in official pronouncements, but also in the investments and organizational activities of the Chinese government. In the early 1980s the central government began a program of direct investments in industrial energy conservation that continues to the present. In addition, concurrently established governmental and quasi-governmental agencies have pursued conservation through administrative and educational measures. In Section 2 of this paper the authors outline the policies and institutions that supported China's program of energy conservation investments in the Sixth and Seventh Five-Year Plans (FYPs) (1981–1985 and 1986–1990). In Section 3 they describe examples of the types of conservation projects pursued in four industrial subsectors: ferrous metals manufacturing; non-ferrous metals mining and manufacturing; chemicals manufacturing; and building materials manufacturing. Section 4 presents a simple methodology for comparing the costs of energy conservation to those of energy supply. Further discussion points out the applicability and limitations of this methodology to State Planning Commission published statistical material on the overall results of energy conservation investments. Though problematic, such analysis indicates that energy conservation investments were probably substantially cheaper than investments in equivalent energy supply would have been. They end with a discussion of some of the difficulties encountered in carrying out the conservation investment programs.

8028 (LUTKDH-TKKA–1001-1-164) **An experimental and theoretical study of multi-cylinder paper drying.** Wilhelmsson, B. Lund Univ. (Sweden). Dept. of Chemical Engineering. Jan 1995. 171p. Order Number DE95737670. Source: OSTI; NTIS.

A mathematical model was developed for the drying of paper in a multi-cylinder drying section. The model is based on the unsteady state, one-dimensional heat conduction equation, which is applied to both the cylinder shell and the paper web. No internal mass transfer phenomena were modelled explicitly. A lumped parameter, the effective thermal conductivity of the paper, implicitly takes these phenomena at least partially into account. Great emphasis was placed on finding the proper heat and mass transfer coefficients that are a part of the boundary conditions of the unsteady state heat conduction equation. Three of these boundary conditions were investigated in detail: * contact heat transfer at the cylinder-paper interface was studied experimentally, * mass transfer at the paper-fabric-air interfaces was also investigated experimentally, and * laminar condensate flow inside the cylinders was studied using a computational fluid dynamics program. Based on the mathematical model, a simulation program was developed. The data predicted by the program compared favorably with measured data from nine different industrial paper dryers. The model applied just as well as lighter paper grades such as newsprint as to heavier grades such as paper board. Two parameters were used to tune the output of the program to the values measured. Both parameters were assigned physically reasonable values confined to a rather narrow range. Studies of the effect of certain input data of the program were also performed. These indicated, for example, that the condensate coefficient and the contact coefficient were the most influential of the heat transfer coefficients, but that the mass transfer coefficient of the dryer fabric was of only slight influence. The potential for simulating different operating conditions was illustrated by several examples. 113 refs

8029 (NEI-DK–1768) **Energy consumption in the primary agricultural activities. Branch analysis.** Gudbjerg, E. (Fredericia Elvaerk (Denmark)); Guul-Simonsen, F.; Lund, I.; Kromann, H.; Lundgaard, N.; Overby, T.; Sams, T.; Kudsk, P.; Lykou, J.; Schriver, P. Danske Elvaerkers Forening, Copenhagen (Denmark); Landbrugets Raadgivningscenter, Aarhus (Denmark); Statens Jordbrugstekniske Forsoeg, Horsens (Denmark). Aug 1994. 220p. (In Danish). Order Number DE95737519. Source: OSTI; NTIS.

The document is one of a series of supplements to 'Haandbog i Energiraadgivning' (Handbook on energy consultancy) and concentrates on the agricultural sector in Denmark. It contains detailed

descriptions of agricultural equipment, processes and working methods and has been written in consultation with specialists in energy saving from the electricity companies, representatives from relevant organizations and research institutions. The main aim is to offer informed and practical suggestions as to ways and means of effectively saving energy also with regard to demands on the handling and storage of raw materials and products. (AB)

8030 (NEI-DK–1769) **Energy consumption in the primary agricultural activities. Branch analysis.** Danske Elvaerkers Forening, Copenhagen (Denmark); Landbrugets Raadgivningscenter, Aarhus (Denmark); Statens Jordbrugstekniske Forsoeg, Horsens (Denmark). Aug 1994. 86p. (In Danish). Order Number DE95737520. Source: OSTI; NTIS.

This supplement to the document of the same title presents case descriptions of 15 farms, tables showing consumption data and other key figures with relation to suggestions as to how to save energy within agriculture. (AB)

8031 (NEI-NO–467) **Studies on control of integrated plants.** Wolff, E.A. Trondheim Univ. (Norway). Norges Tekniske Hoegskole. Jul 1994. 143p. Order Number DE95737634. Source: OSTI; NTIS.

Chemical process plants often apply integration, or coupling between units, to enhance energy and raw material efficiency. This integration between units introduces interaction and may make the plant difficult to operate. This thesis studies how the control properties of plants are affected by integration. Integration topics that are considered are mass recycle, information integration between control levels and heat integration. This work presents procedures and new analysis tools that give a better evaluation of a plants inherent control properties. The gains from such an enhanced analysis are demonstrated through examples. Mass recycle in chemical reaction systems is investigated with respect to control quality. The multivariable effects of introducing recycle are described and analyzed with respect to interaction and disturbance rejection. Several purge actuator configurations are studied and it is shown how their fundamental difference in propagating secondary effects is important. The effect on the results of varying model detail is also studied. The integration of information between control levels is investigated with respect to interaction. Applied to cascade control in distillation the results show how controller tuning can be tailored to achieve one way interaction only. This work shows how a secondary control loop may alter the preferred choice of quality control configuration. An integrated distillation design for separating ternary mixtures is given a comprehensive dynamic analysis for the first time. It is shown that utilization of all the available degrees of freedom for control is difficult. "Holes" in the operating range where fulfilling the specifications is impossible are described. Control solutions are presented and the design is compared to conventional ternary distillation schemes. 93 refs., 66 figs., 17 tabs.

8032 (ORNL–6805, pp. 37-42) **1,1,1,4,4,4 Hexafluorobutane, a new non-ozone-depleting blowing agent for rigid PUR foams.** Lamberts, W.M. (Bayer AG, Leverkusen (Germany)). Oak Ridge National Lab., TN (United States). [1994]. (CONF-9309409–: 1993 non-fluorocarbon insulation, refrigeration and air-conditioning technology workshop, Wiesbaden (Germany), 27-29 Sep 1993). In *Proceedings of the 1993 non-fluorocarbon insulation, refrigeration and air conditioning technology workshop.* 329p. Order Number DE94018333. Source: OSTI; NTIS.

HCFCs are widely accepted to be technically promising replacements for CFCs in rigid PUR foams, especially for appliance applications. Despite this, political pressure is rising to limit their use to a transition period. One of the reasons is their residual ozone depletion potential. In the search for long term substitutes for both CFCs and HCFCs, we have identified and developed a new blowing agent and insulation gas: 1,1,1,4,4,4 hexafluorobutane (HFC-356). Important properties of the hexafluorobutane are: chlorine-free/non-ozone-depleting; very short atmospheric lifetime/minor greenhouse activity; non-flammable; no explosion limits; suitable boiling point; low gas phase thermal conductivity; and compatibility with appliance inner linear plastics. These properties allow the use of established appliance construction and foaming technology. Nevertheless, reformulation of the PUR components was necessary to design the first PUR appliance system with hexafluorobutane. Extensive laboratory scale testing including foaming of cabinets has been conducted with good results. In comparison with 50% CFC-reduced systems, it fulfills the technical standards of the European appliance industry concerning: cell size/cell structure; flow properties/foam density; thermal conductivity/energy consumption; aging behaviour; demould properties; dimensional stability/compressible strength; and compatibility with SB and ABS inner liners. According to the regulations on chemical substances worldwide, hexafluorobutane is a new chemical substance which requires notification before commercialization. Ecological and toxicological testing of hexafluorobutane is in progress, but not yet completed. Results from acute and subacute inhalation toxicity testing are acceptable and encourage further development of this product.

8033 (ORNL–6805, pp. 43-51) **HFC 356, a zero ODP blowing agent candidate for North American appliance foam formulations.** Ball, E.E. (Miles Inc., Pittsburgh, PA (United States)); Lamberts, W.M. Oak Ridge National Lab., TN (United States). [1994]. (CONF-9309409–: 1993 non-fluorocarbon insulation, refrigeration and air-conditioning technology workshop, Wiesbaden (Germany), 27-29 Sep 1993). In *Proceedings of the 1993 non-fluorocarbon insulation, refrigeration and air conditioning technology workshop.* 329p. Order Number DE94018333. Source: OSTI; NTIS.

The household refrigeration industry in the USA is being challenged on two issues. These issues are depletion of the ozone layer by CFCs and federally mandated energy consumption standards for the products sold in the US. The global issue of ozone depletion affects all domestic appliance producers in North America. The energy consumption issue, however, only affects those producers who desire to sell their products in the US. In addressing the ozone depletion issue the North American manufacturers of household refrigerators and freezers have accepted HCFCs as the most promising available blowing agent substitutes for CFCs in their polyurethane foam insulations. Over the past few years a great deal of effort has gone into the development of polyurethane foam insulations blown with HCFCs which have the properties required by the North American household refrigeration industry. Between now and 1995 we expect a conversion of the industry from CFC to HCFC blown polyurethane foam insulations. HCFCs, however, are only transition materials. Since their ozone depletion potentials are not zero, they too are scheduled for production caps and phase-out under the provisions of the amendments to the Montreal Protocol. Thus, it is necessary to begin the development now on the next generation of North American appliance foam formulations which do not use ozone depleting substances as blowing agents.

8034 (ORNL–6805, pp. 53-62) **Blowing agents: The next generation.** Decaire, B.R. (Allied-Signal Inc., Buffalo, NY (United States)); Pham, H.T.; Richard, R.G.; Shankland, I.R. Oak Ridge National Lab., TN (United States). [1994]. (CONF-9309409–: 1993 non-fluorocarbon insulation, refrigeration and air-conditioning technology workshop, Wiesbaden (Germany), 27-29 Sep 1993). In *Proceedings of the 1993 non-fluorocarbon insulation, refrigeration and air conditioning technology workshop.* 329p. Order Number DE94018333. Source: OSTI; NTIS.

It is increasingly recognized that HCFC materials are transitional or interim substances which will have limited commercial lifetimes as foam blowing agents. These materials, which are necessary for a rapid and complete phaseout of CFC blowing agents, will ultimately need to be replaced by even more environmentally benign blowing agents. The paper addresses two general blowing agent options: The conventional liquid blowing agent, and the lower boiling, so-called gaseous blowing agent. Liquid blowing agents like CFC-11 and HCFC-141b simplify foam processing techniques as well as blowing agent storage, handling and transportation. Optimum properties for this class of blowing agents, such as boiling point, flammability and thermal conductivity are summarized. Chemical classes, for example hydrofluorocarbons (HFCs) and hydrofluoroethers (HFEs), from which a next generation blowing agent might be chosen are discussed; physical properties of some model compounds chosen from these families are presented. The model compound data show that retaining the vapor insulation characteristics of HCFC-141b will be a challenge given that the

more complicated polyatomic HFCs and HFEs tend to exhibit higher vapor phase thermal conductivities. There are several HFC gases which are also potential blowing agents, for instance HFC-134a, which is currently being introduced as a commercial product as well as others like HFCs 32 and 125 which are currently under development. Vapor phase thermal conductivity data are presented which show that these species are also poorer insulators than HCFC-141b. Polyol solubility for the HFC gases can be significantly less than even HCFC-22 when compared on a theoretical equivalent (mole) substitution, i.e., a higher vapor pressure is required to maintain an equivalent solution of HFC gas in a polyol than is required for HCFC-22. These and other data presented will impact the choice of the next generation blowing agent.

8035 (ORNL–6805, pp. 63-75) **Cyclopentane as blowing agent for rigid polyurethane foam in refrigerator insulation.** Adams, S. Oak Ridge National Lab., TN (United States). [1994]. (CONF-9309409–: 1993 non-fluorocarbon insulation, refrigeration and air-conditioning technology workshop, Wiesbaden (Germany), 27-29 Sep 1993). In *Proceedings of the 1993 non-fluorocarbon insulation, refrigeration and air conditioning technology workshop.* 329p. Order Number DE94018333. Source: OSTI; NTIS.

Rigid polyurethane (PUR) foam is the major insulation material in household and commercial refrigeration. Production, design and properties of refrigerators, freezers and display cabinets correspond strongly to: the easy processing of PUR systems; their ability to form a light sandwich structure; and their good insulation values. Our target was, to look for economical Zero-ODP PUR blowing agents. They must be able to be used in existing production facilities with acceptable efforts in reconstruction. We had to focus on good insulation values, because an increase in energy consumption isn't acceptable at all. For the tight time frame of Chlorofluorocarbon (CFC)-substitution given, we had to look for alternatives which are or can be made available in industrial Quantities in time.

8036 (ORNL–6805, pp. 77-86) **Water-blown rigid urethane foam for thermal insulation.** Beddies, H. (Univ. of Stuttgart (Germany)); Wagner, K.E.; Hesselbach, I.J. Oak Ridge National Lab., TN (United States). [1994]. (CONF-9309409–: 1993 non-fluorocarbon insulation, refrigeration and air-conditioning technology workshop, Wiesbaden (Germany), 27-29 Sep 1993). In *Proceedings of the 1993 non-fluorocarbon insulation, refrigeration and air conditioning technology workshop.* 329p. Order Number DE94018333. Source: OSTI; NTIS.

Due to low thermal conductivity and good mechanical properties rigid urethane foam (RUF) is often used for thermal insulation applications. The low thermal conductivity of the foam is based on the use of CFC 11, which has the lowest λ-value of all used blowing agents. With the prohibition of CFC 11 (in Germany on January 1st of 1995) industry and research institutes are looking for suitable alternatives. Within the research project "Halonefree Urethane Foam" supported by the German Ministry of Research and Technology, the IKP is optimizing water-blown polyurethane-systems without using halone containing additives and blowing agents.

8037 (PNL–10365) **Commercial equipment cost database.** Freeman, S.L. Pacific Northwest Lab., Richland, WA (United States). Jan 1995. 105p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. Order Number DE95006191. Source: OSTI; NTIS; GPO Dep.

This report, prepared for DOE, Office of Codes and Standards, as part of the Commercial Equipment Standards Program at Pacific Northwest Laboratory, specifically addresses the equipment cost estimates used to evaluate the economic impacts of revised standards. A database including commercial equipment list prices and estimated contractor costs was developed, and through statistical modeling, estimated contractor costs are related to equipment parameters including performance. These models are then used to evaluate cost estimates developed by the ASHRAE 90.1 Standing Standards Project Committee, which is in the process of developing a revised ASHRAE 90.1 standard. The database will also be used to support further evaluation of the manufacturer and consumer impacts of standards. Cost estimates developed from the database will serve as inputs to economic modeling tools, which will be used to estimate these impacts. Preliminary results suggest that list pricing is a suitable measure from which to estimate contractor costs for commercial equipment. Models developed from these cost estimates accurately predict estimated costs. The models also confirm the expected relationships between equipment characteristics and cost. Cost models were developed for gas-fired and electric water heaters, gas-fired packaged boilers, and warm air furnaces for indoor installation. Because of industry concerns about the use of the data, information was not available for the other categories of EPAct-covered equipment. These concerns must be addressed to extend the analysis to all EPAct equipment categories.

8038 (PNL-SA–24367) **Rejuvenation and recovery of electroplating acids using the WADR technology.** Jones, E.O. (Pacific Northwest Lab., Richland, WA (United States)); Litt, R.D.; Chauhan, S. Pacific Northwest Lab., Richland, WA (United States). Oct 1994. 6p. Sponsored by USDOE, Washington, DC (United States);Department of Defense, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-941007–4: Joint power generation conference, Phoenix, AZ (United States), 2-6 Oct 1994). Order Number DE95004568. Source: OSTI; NTIS; GPO Dep.

Acid baths at the US Air Force/Oklahoma City Air Logistic Center (OC-ALC) will be rejuvenated by the use of a new technology – Waste Acid Detoxification and Reclamation (WADR), a distillation process that concentrates the metals and creates a clean reusable acid. The concentrated metals are recovered for disposal or recycling. A 200-gallon batch prototype system will be installed and demonstrated on HCl, HNO_3 and H_2SO_4 baths at OC-ALC's electroplating shop in late 1994. The system was tested in the summer of 1994 with typical industrial spent acids. The WADR system is expected to reduce waste from the OC-ALC acid baths by 80% to 90% as compared with current treatment operations. Laboratory test results and the prototype system design are presented here. The technology is expected to meet the needs of various industries generating spent acids with increasing disposal costs.

8039 (SAND–93-2122) **Summary report: Assessment and opportunity identification of energy efficient pollution prevention technologies and processes.** Sandia National Labs., Albuquerque, NM (United States). Nov 1994. 19p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. Order Number DE95004728. Source: OSTI; NTIS; GPO Dep.

On October 24, 1992, the President signed the Energy Policy Act of 1992 (EPAct, Public Law 102-486). Section 2108, subsections (b) and (c), of EPAct requires the Department of Energy to identify opportunities to demonstrate energy efficient pollution prevention technologies and processes; to assess the availability and the energy, environmental, and cost effects of such technologies; and to report the results within one year. This report is in response to that requirement. National waste reduction efforts in both the private and public sectors encompass a variety of activities to decrease the amount of wastes that ultimately enter their air, water, and land. DOE's Office of Industrial Technologies (DOE/OIT) recognized the importance of these efforts and confirmed the federal government's commitment to waste reduction by establishing the Industrial Waste Program (IWP) in 1990. The program is driven by industry and national needs, and is working on new technologies and information dissemination that industry identifies as vital. The national benefits of new technologies do not accrue to the economy until transferred to industry and incorporated into commercially available processes or products.

8040 (SAND–94-2568) **Full report: Assessment and opportunity identification of energy efficient pollution prevention technologies and processes.** Sandia National Labs., Albuquerque, NM (United States). Nov 1994. 225p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. Order Number DE95004692. Source: OSTI; NTIS; GPO Dep.

US industry produces about 12 billion tons of waste a year, or two-thirds of the waste generated in the US. The costs of handling and disposing of these wastes are significant, estimated to be between $25 and $43 billion in 1991, and represent an increase of 66% since 1986. US industry also uses about one-third of all energy consumed in the nation, which adds to the environmental burden. Industrial wastes affect the environmental well-being of the nation and, because of their growing costs, the competitive abilities

of US industry. As part of a national effort to reduce industrial wastes, the US Congress passed the Energy Policy Act (EPAct, P.L. 102-486). Section 2108, subsections (b) and (c), of EPAct requires the Department of Energy (DOE) to identify opportunities to demonstrate energy efficient pollution prevention technologies and processes; to assess their availability and the energy, environmental, and cost effects of such technologies; and to report the results. Work for this report clearly pointed to two things, that there is insufficient data on wastes and that there is great breadth and diversity in the US industrial sector. This report identifies: information currently available on industrial sector waste streams, opportunities for demonstration of energy efficient pollution prevention technologies in two industries that produce significant amounts of waste–chemicals and petroleum, characteristics of waste reducing and energy saving technologies identifiable in the public literature, and potential barriers to adoption of waste reducing technologies by industry.

3206 Municipalities and Community Systems

Refer also to citation(s) 7542, 8013

8041 (BNL–61006) **A summary of the report on prospects for pyrolysis technologies in managing municipal, industrial, and Department of Energy cleanup wastes.** Reaven, S.J. Brookhaven National Lab., Upton, NY (United States). Aug 1994. 26p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. Order Number DE95005003. Source: OSTI; NTIS; GPO Dep.

Pyrolysis converts portions of municipal solid wastes, hazardous wastes and special wastes such as tires, medical wastes and even old landfills into solid carbon and a liquid or gaseous hydrocarbon stream. In the past twenty years, advances in the engineering of pyrolysis systems and in sorting and feeding technologies for solid waste industries have ensured consistent feedstocks and system performance. Some vendors now offer complete pyrolysis systems with performance warranties. This report analyzes the potential applications of pyrolysis in the Long Island region and evaluates the four most promising pyrolytic systems for their readiness, applicability to regional waste management needs and conformity with DOE environmental restoration and waste management requirements. This summary characterizes the engineering performance, environmental effects, costs, product applications and markets for these pyrolysis systems.

8042 (DOE/CE/15558–T3) **Final report on Thermally Modified Sand demonstration project.** Gilfilian Engineering and Environmental Testing, Inc., Anchorage, AK (United States). 23 Sep 1994. 27p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG01-93CE15558. Order Number DE95004704. Source: OSTI; NTIS; GPO Dep.

The use of salt and salt/sand mixtures on icy roadway surfaces has dramatically increased during the past 30 years. Despite extensive documentation on salt related damage to the roadway improvements, vehicles and the environment, road maintenance departments have continued to rely on this practice. Road maintenance departments in northern climate areas have long recognized the safety benefits for public mobility on icy roadways from the use of sand. As an abrasive material, the sand improves the surface traction that results in more drivable and less hazardous road conditions during the winter months. Stockpiles of pure sand stored during the winter months oftentimes freeze into large unworkable, monolithic piles. To maintain a free-flowing condition, it has been found to be necessary to add salt to the sand. The addition of salt in amounts ranging from 5 to 10 percent to that of sand, is usually sufficient to provide relatively free-flowing abrasive material that could be stored in stockpiles and applied to icy road surfaces with conventional sand spreading trucks. Another alternative for winter storage of pure sand to maintain a free-flowing condition is in humidity-controlled, heated buildings. As would be expected, this method has high capital and operating costs. and not cost effective for general highway maintenance use. The invention demonstrated herein is a method of thermally modifying pure sand that will remain in a free-flowing state throughout the winter season without the need for the salt additive. The thermally modified sand provides an abrasive material that when applied to icy roads does not cause environmental and corrosive damage as done by the application of sand with salt. By employing a very simple process of freezing screened sand particles by forced air convection under subfreezing conditions, the invention creates a product that has significant value in terms of economic and environmental benefits.

8043 (DOE/CE/26610–T1) **City of New Orleans Ammonia District Cooling Plant. Final report.** Guillot-Vogt Associates, Inc., Metairie, LA (United States). 16 Sep 1993. 15p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG01-91CE26610. Order Number DE95005810. Source: OSTI; NTIS; GPO Dep.

The paper solicits proposals to perform chilled water cooling system services for a group of buildings in New Orleans, Louisiana.

8044 (DOE/CH/10093–273) **Blazing the energy trail: The Municipal Energy Management Program.** National Renewable Energy Lab., Golden, CO (United States). Dec 1994. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC36-83CH10093. Order Number DE94000271. Source: OSTI; NTIS; GPO Dep.

The Urban Consortium Energy Task Force pioneers energy and environmental solutions for US cities and counties. When local officials participate in the task force, they open the door to many resources for their communities. The US is entering a period of renewed interest in energy management. Improvements in municipal energy management allow communities to free up energy operating funds to meet other needs. These improvements can even keep energy dollars in the community through the purchase of services and products used to save energy. With this idea in mind, the US Department of Energy Municipal Energy Management Program has funded more than 250 projects that demonstrate innovative energy technologies and management tools in cities and counties through the Urban Consortium Energy Task Force (UCETF). UCETF helps the US Department of Energy foster municipal energy management through networks with cities and urbanized counties and through links with three national associations of local governments. UCETF provides funding for projects that demonstrate innovative and realistic technologies, strategies, and methods that help urban America become more energy efficient and environmentally responsible. The task force provides technical support to local jurisdictions selected for projects. UCETF also shares information about successful energy management projects with cities and counties throughout the country via technical reports and project papers. The descriptions included here capsulize a sample of UCETF's demonstration projects around the country.

8045 (DOE/MC/27205–3963) **AFBC co-firing of coal and hospital waste. Quarterly progress report, May 1, 1994–July 31, 1994.** Stuart, J.M. Department of Energy, Morgantown, WV (United States). Morgantown Energy Technology Center. [1994]. 25p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FC21-91MC27205. Order Number DE95006147. Source: OSTI; NTIS; GPO Dep.

Objective is to design, construct, install, and provide operator training and start up a circulating fluidized bed combustion system at the Lebanon, PA Veteran's Affairs Medical Center. This unit will co-fire coal and hospital waste, providing inexpensive and efficient destruction of both general and infectious hospital waste and steam generation. The State permitting process required for construction is completed. Construction and equipment fabrication is continuing, as is equipment purchase from vendors. The foundation was completed. A current schedule is included.

8046 (ETDE-DE–4) **Sewage sludge pyrolysis/conversion: disposal of sewage sludge with the production of oils. Final report.** Weghaus, M. Noell GmbH, Wuerzburg (Germany). 30 May 1992. 337p. (In German). Sponsored by Bundesministerium fuer Forschung und Technologie, Bonn (Germany). Foerderkennzeichen BMFT 02WS8835. Order Number DE95738929. Source: OSTI; NTIS (US Sales Only).

The BTX outputs were investigated in the sphere of medium temperature pyrolysis depending on temperature and retention time

with the tests at the Technical College plant in Hannover-Langenhagen. The results show that a constant BTX output was achieved in the whole field of work. (orig.)

8047 (KE–93035G) **A study on resources survey and characteristic of wastes in Korea(II).** Park, Y.J. (Korea Institute of Energy Research, Taejon (Korea, Republic of)); Cho, M.J.; Ha, Y.J.; Park, K.H.; Koh, C.B.; Kim, J.K. No corporate text available. Dec 1993. 345p. (In Korean). Order Number DE95744283. Source: OSTI; NTIS (US Sales Only).

The production rate per one day was 75,096T/D. The production rates per one person per one day was 1.8kg/c.d which was reduced by 18.6% in 1992. The amount of waste treated by landfill was 66,965T/D or 89/1%, that by incineration was 1,132T/D or 1.5%, and that by recycling was 5,912T/D or 7.9%. The production rates and states of treatment, landfill areas, treatment schedule and components of the municipal solid wastes of three cities of Pusan, Daejeon and Chungju are investigated. Physical components were as follows; paper 18.2%, vinyl and plastics 14.1%, rubber and leather 1.1%, textile 2.8%, wood 1.8%, food waste 48.7%, metals 3.9%, glass 7.4%, and others 2.0%. Moisture contents, combustible components and ignition ashes were investigated 46.0%, 39.4%, and 14.6%, respectively. Heating values were as follows ; high heating values 5,063kcal/kg, low heating values 2,129kcal/kg. For chemical components were as follows ; carbon 46.3%, hydrogen 6.6%, oxygen 43.2%, nitrogen 1.5%, sulfur 0.2%, and chlorine 2.2%. The problems of reuse of the wastes and collection of the classified garbage wastes are analyzed and thier solutions are suggested. (author). refs., figs., tabs.

8048 (NEI-DK–1813) **District heating strategy plan for Lithuania. Report C. General proposals for rehabilitation projects.** Danish Energy Consultants, Glostrup (Denmark). Jun 1994. 120p. Contract IMOe-768; Contract ENs-2124/59-0003. Order Number DE95737592. Source: OSTI; NTIS.

In this report, a number of general proposals for the Lithuanian district heating systems are described, partly based on the proposals from the pilot projects. The proposals are divided into: Proposals are divided into: Proposals concerning heat production, heat distribution and heat consumption. For each of the proposals an economic and an environmental analysis have been carried out. The tables of heat production, distribution and consumption give an overview of the proposals and show the results of the economic analyses. For a few of the proposals the total quantity and investment needed in Lithuania has been assessed. Equipment for Vilnius, Alytus and Kaunas is not included in these totals, since equipment for these cities is described in separate reports/studies. For most of the projects it is not possible to assess the quantities without more detailed investigations. (EG)

8049 (NREL/TP–463-7230) **Hourly simulations of hybrid renewable energy systems for San Cristobal/Santa Barbara, Guatemala.** Holz, R. (National Renewable Energy Lab., Golden, CO (United States)); Corbus, D.; Hurley, P.; Aguilar, I. National Renewable Energy Lab., Golden, CO (United States). Nov 1994. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC36-83CH10093. (CONF-950116–4: 1995 American Society of Mechanical Engineers (ASME) energy sources technology conference and exhibition, Houston, TX (United States), 29 Jan - 1 feb 1995). Order Number DE95000265. Source: OSTI; NTIS; GPO Dep.

This paper presents the results of a conceptual systems analysis comparing alternative, renewable energy-based, hybrid power systems to a conventional diesel genset for a remote, non-electrified village in Guatemala. A time-series computer simulation model, HYBRID1, was used to calculate the performance of the various systems; a separate analysis was used to determine the life-cycle cost of energy for each system. Detailed hourly simulation computer models, such as HYBRID1, are necessary to properly account for the time-varying loads, renewable resources, performance of the generators, and battery state of charge, as well as accommodating alternative system architectures and control/dispatch strategies. The analysis considers several anticipated load profiles for the village, to account for the possibilities of productive and water pumping loads in addition to the base load of household lighting and communications. For this particular site, the lowest cost of energy would be supplied by a wind-diesel-battery system, with a control strategy that operated the diesel in a backup (switched) mode.

8050 (NUTEK-FJV–94-7) **Energy dense water.** Fransson, Aake (University of Umeaa, Department of Applied Physics (Sweden)); Skoglund, P. Swedish National Board for Industrial and Technical Development (NUTEK), Stockholm (Sweden). 1994. 73p. Project NUTEK-656-112. Order Number DE95737653. Source: OSTI; NTIS.

This is the final report of the project Energy dense water. Separate abstracts have been prepared for 4 of the 6 papers included

8051 (NUTEK-FJV–94-7, pp. 1-5 (Paper I)) **Increased energy capacity in district heating fluids.** Fransson, Aake (University of Umeaa, Department of Applied Physics (Sweden)). Swedish National Board for Industrial and Technical Development (NUTEK), Stockholm (Sweden). 1994. Project NUTEK-656-112. In *Energy dense water.* 73p. Order Number DE95737653. Source: OSTI; NTIS.

The effective energy in a district heating system is limited by the heat capacity of the circulating water. This energy is emitted when the water is cooled. The energy transport capacity of a district heating system can be increased if a suitable phase-change material is added to the transmission fluid. The latent heat, liberated at the crystallization process, is for some materials very high. A high transition energy would compensate the decrease in heat capacity arised from the reduction in the volume of the transmission fluid. The aim of this new research program on advanced fluids is to get an understanding for and improve the essential thermodynamic, kinetic and technical limitations of materials that may be used as additives. Measurements of significant thermodynamic properties such as the hysteresis of the melting/crystallization temperature and the heat of crystallization will be discussed for some polyesters. 15 refs, 4 figs

8052 (NUTEK-FJV–94-7, pp. 1-18 (Paper II)) **Specific heat capacity and melting/crystallisation characteristics of polytridecanolactone.** Skoglund, P. (University of Umeaa. Department of Applied Physics (Sweden)); Fransson, Aake. Swedish National Board for Industrial and Technical Development (NUTEK), Stockholm (Sweden). 1994. Project NUTEK-656-112. In *Energy dense water.* 73p. Order Number DE95737653. Source: OSTI; NTIS.

An investigation of the thermodynamically properties of polytridecanolactone (PTDL), has been made with the aid of a differential scanning calorimeter (DSC). PTDL is a linear polyester and belongs to the polylactones which is poorly investigated. In this paper we contribute with specific heat capacity in the range 180-400 K, melting and glass transition characteristics. Further, we present unique results corresponding to the effect of different cooling rates on crystallisation temperatures and crystallisation energies. PTDL has a melting temperature of 350 K, and a glass transition at about 237 K. The crystallisation results show that PTDL crystallizes easily, with a crystallisation degree of about 80%. Further, the crystallisation energy decreases with increasing cooling rate, and levels out at a constant value at higher cooling rates. The crystallisation temperature on the other hand, shows an increasing sensitivity of cooling rate, where the supercooling is increasing more rapid at higher cooling rates. 25 refs, 3 figs, 1 tab

8053 (NUTEK-FJV–94-7, pp. 1-11 (Paper III)) **District heating. Research summary 1988-1993.** Swedish National Board for Industrial and Technical Development (NUTEK), Stockholm (Sweden). 1994. Project NUTEK-656-112. In *Energy dense water.* 73p. Order Number DE95737653. Source: OSTI; NTIS.

This paper gives a thorough review of the research made in the field of district heating during 1988-1993. 29 refs, 10 figs

8054 (NUTEK-FJV–94-7, pp. 1-21 (Paper VI)) **About the influence on the heat load from net structure and operating strategy for a DH-network.** Andersson, Staffan (University of Umeaa, Department of Applied Physics (Sweden)). Swedish National Board for Industrial and Technical Development (NUTEK), Stockholm (Sweden). 1994. Project NUTEK-656-112. In *Energy dense water.* 73p. Order Number DE95737653. Source: OSTI; NTIS.

A district heating network acts like a heat storage device, due to the finite circulation times in combination with the performances of the attached substations. This means that the heat load at the district heating plant is not only determined by the substations heat demand. In this article the influence on the heat load from net structures and operational strategies for the primary supply water temperature is discussed from a simple deterministic model of a district heating network. In the used model the flow demands and return temperatures of the substations of two-stage type are calculated for ideal static conditions. The circulation time of the primary water is calculated from flows and pipe dimensions under ideal conditions where heat losses are neglected. The obtained result shows that the commonly used strategy for the supply temperature (increasing with decreasing outdoor temperature) in combination with the net structure yields amplified variations of the heat load compared to the demands of the attached consumers. It is also shown that from a more elaborate choice of supply temperature the variations of the heat load may be reduced. 4 refs, 8 figs

8055 (PNL-SA–24553) **Raman spectroscopic studies in supercritical water.** Bowman, L.E.; Fulton, J.L. Pacific Northwest Lab., Richland, WA (United States). Oct 1994. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-9410114–3: 3. international symposium on supercritical fluids, Strasbourg (France), 17-19 Oct 1994). Order Number DE95004577. Source: OSTI; NTIS; GPO Dep.

Reaction studies have been carried out on the destruction of nitrogen-containing compounds such as ammonium, nitrates, and species containing aromatic nitro functionality. The destruction of ammonium ion in near-critical and supercritical water using Raman spectroscopy is the subject of this presentation. Reaction rates were determined from Raman spectra and from measurements of system pressure. Concentrations of key species in the reactor effluent were determined via off-line assay. The effects of temperature, pressure, and concomitants on reaction rate were determined. The reaction half-life is below ten seconds at 400 C with better than 95% conversion. Oxides of nitrogen were not generated in detectable quantities. The studied system is a model for the destruction of ammonium in municipal wastes.

3209 Education and Public Relations

Refer also to citation(s) 7889

33 ADVANCED PROPULSION SYSTEMS

3301 Internal Combustion Engines

Refer also to citation(s) 7572

8056 (DOE/NASA–0329-2) **Advanced Diesel Engine Component Development Program, final report - tasks 4-14.** Kaushal, T.S.; Weber, K.E. National Aeronautics and Space Administration, Cleveland, OH (United States). Lewis Research Center. Nov 1994. 194p. Sponsored by USDOE, Washington, DC (United States);National Aeronautics and Space Administration, Washington, DC (United States). Contract DEN 3-329. (NASA/CR–191203). Order Number DE95004832. Source: OSTI; NTIS; GPO Dep.

The Advanced Diesel Engine Component Development (ADECD) Program is a multi-year, multi-phase effort to develop and demonstrate the critical technology needed to advance the heavy-duty low heat rejection (LHR) engine concept for the long-haul, heavy-duty truck market. The ADECD Program has been partitioned into two phases. The first phase, Phase 1, was completed in 1986, resulting in definition of the Advanced Diesel Reference Engine (ADRE)III. The second phase, Phase 11/111, examines the feasibility of the ADRE concepts for application to the on-highway diesel engine. Phase 11/111 is currently underway. This project is sponsored by the U.S. Department of Energy, Office of Transportation Technologies. The work has been performed by the Detroit Diesel Corporation (DDC) under Contract DEN3-329 with the NASA Lewis Research Center, who provide project management and technical direction.

8057 (ETDE-DE–1) **Improvements in heavy oil fuel systems for marine diesel engines.** Kirschnick, H.H. (comp.). Technische Univ. Berlin (Germany). Inst. fuer Schiffs- und Meerestechnik. Jun 1989. 210p. (In German). Sponsored by Bundesministerium fuer Forschung und Technologie, Bonn (Germany). Foerderkennzeichen BMFT MTK0426. Order Number DE95738918. Source: OSTI; NTIS (US Sales Only).

The project is concerned with the investigation of two fuel preparation systems in real on-board operation. The two systems which consist on the one hand of a decanter/separator combination and, on the other, of a simple homogeniser/filter combination (fine filtration) requiring little maintenance, should be compared regarding the cleaning effort and the effect on the drive plant, which is determined by running bush gusset wear measurements. Further, the operation of a simplified fuel supply system, which is designed as an 'open' system with recirculation via the day's tank, is to be examined. The research project comprises two phases: Phase 1: Operation of the fuel system during a six-month period. Phase 2: Operation of the fuel system with some modifications for another six-month period. (orig./HW)

8058 (LUTMDN-TMVK–7016) **Impact of combustion chamber geometry on charge stratification in a CNG fueled direct injection Otto engine.** Egnell, R. Lund Univ. (Sweden). Dept. of Heat and Power Engineering. Dec 1994. 179p. Order Number DE95737683. Source: OSTI; NTIS.

The modest objective of the Stratified Charge (SC) system presented in this report is to solve the problem with emissions of nitrogen oxide and particulate from diesel engines without sacrificing the good fuel economy. In theory it should be possible to reach this goal as the emission levels are not related to the efficiency of this engine type. The suggested solution is based on a combustion chamber design and an injection system that makes it possible to better control the stratification process. The fuel, in this case natural gas, is deposited in a restricted and load dependent volume of the conically shaped combustion chamber by a long fuel injection tube. At the beginning of the project the question whether or not the injection tube would survive in this environment had the highest priority. Hence a theoretical analysis of the heat loads on the tube was initiated. The results from the tests clearly indicate that the stratification process can be controlled by the geometry of the combustion in combination with the fuel injection system. The new system makes it possible to limit the fuel diffusion and maintain a richer mixture in a predetermined part of the combustion chamber. Thus the emissions of unburned fuel can be reduced if compared with a SC system with a conventional combustion chamber. However, in the present SC system it is not possible to control the air/fuel ratio distribution within the mixture. Emission data indicates the combustion of the fuel charge takes place at different conditions giving high emissions of soot, nitrogen oxide and unburned fuel at the same time. In order to continue the development work of the new SC system the combustion chamber must be optically accessible to make visual studies and laser based measurements possible. 33 refs., 156 figs

8059 (LUTMDN-TMVK–7017) **The development of diagnostic techniques for the spark discharge and the flame characteristics, applied in a lean burn spark ignition engine to examine the relations between the spark discharge, the flame, the heat release and the fluid flow.** Lassesson, B.; Marforio, K. Lund Univ. (Sweden). Dept. of Heat and Power Engineering. Dec 1994. 198p. Order Number DE95737682. Source: OSTI; NTIS.

This thesis deals with the development of measurement systems for a research SI-engine, operating with lean air-fuel mixture, to examine the causes of cycle to cycle variations. The data acquisition system consists of four major parts: A flame imaging system and measurement systems for spark ignition parameters, in cylinder fluid flow and cylinder pressure. This report deals with the designing of the flame imaging and spark ignition measurement systems. Measurements have been performed of a single cylinder research engine. The purpose of the flame imaging system was to extend the heat release analyses to a much lower degree than the pressure measurement allows. To achieve information about the combustion start, the supplied voltage and current to the spark plug was measured and analysed. The data, achieved from the

entire acquisition system, have been statistically analysed to investigate the correlation between the combustion parameters, i.e. the mean velocity and turbulence of the air-fuel mixture in the vicinity of the spark plug, the breakdown voltage and supplied current to the spark plug, the flame development from the imaging system and the heat release parameters from the pressure analyses. The flame imaging system consists of two single shot CCD-cameras and they have been used with schlieren technique in two configurations, one time resolving and one 'two-view' arrangement. The spark current was measured during five decades of time. To achieve this, it was necessary to use a very fast digital storage oscilloscope to resolve the first micro second and extended with an ordinary storage oscilloscope to measure the entire spark duration. 23 refs., 9 tabs., 160 figs

3303 Electric-Powered Systems

Refer also to citation(s) 7831, 8062

8060 (DOE/METC–94/1010, pp. 105-108) **Proton exchange membrane fuel cell for transportation.** Fronk, M.H. (General Motors Corp., Detroit, MI (United States)). USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States); USDOE Morgantown Energy Technology Center, WV (United States). Aug 1994. DOE Contract AC02-90CH10435. (CONF-940883–: Fuel cells '94, Morgantown, WV (United States), 17-19 Aug 1994). In *Proceedings of the fuel cells '94 contractors review meeting.* 191p. Order Number DE94012285. Source: OSTI; NTIS; GPO Dep.

The objectives of the first phase of the program was to demonstrate the feasibility of a 10 kW fuel cell powerplant fueled by methanol. This powerplant is based on a methanol fuel processor and a proton exchange membrane (PEM) fuel cell stack. In the second phase, the powerplant will be scaled up to 30 kW and a 60 kW brassboard system with a 30 kW battery will be built. In the final phase, the fuel cell powerplant will be scaled to 45-60 kW and a proof-of-concept fuel cell vehicle will be built and tested.

8061 (DOE/METC–94/1010, pp. 109-110) **Phosphoric acid fuel cell for buses.** Kaufman, A. (H-Power Corp., Belleville, NJ (United States)). USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States); USDOE Morgantown Energy Technology Center, WV (United States). Aug 1994. DOE Contract AC02-91CH10447. (CONF-940883–: Fuel cells '94, Morgantown, WV (United States), 17-19 Aug 1994). In *Proceedings of the fuel cells '94 contractors review meeting.* 191p. Order Number DE94012285. Source: OSTI; NTIS; GPO Dep.

A methanol-fueled, phosphoric acid fuel cell (PAFC) powered bus has been built under Phase II of a cost-shared Government program. The current project is utilizing the technology of Phase I, in which liquid-cooled PAFC technology was shown to be suitable for use in transit bus applications. The objective of the Phase II project is to integrate and demonstrate a PAFC/battery power source in actual bus use. This project will produce three 30-foot test-bed buses and the conceptual design for a 40-foot bus. The methanol-fueled PAFC-powered bus offers attractive incentives in the areas of reduced noxious emissions (CO typically 50-100 times lower and NO_x typically 2000-3000 times lower than the 1998 federal heavy-duty diesel exhaust emission standards and virtually no hydrocarbons or particulate matter, based on current PAFC system technology); domestically-produced alternative fuel usage; higher propulsion system efficiency (higher vehicle mileage per unit of fuel energy content in relation to corresponding diesel power plants that operate on either diesel or methanol fuel); and greatly reduced noise pollution. These fuel cell buses are being built so as to be fully consistent with the design requirements of heavy-duty transit buses in service today. These include performance criteria (acceleration; hill-climbing; top speed) as well as comfort (e.g., heating/air conditioning) and safety features. The test-bed bus incorporates seats for 25 passengers and the driver. In addition, in compliance with Americans with Disabilities Act (ADA) requirements, a wheelchair lift is provided along with means to accommodate two wheelchairs.

3304 Hybrid Systems

8062 (NREL/TP–473-7026) **Developing a standardized test procedure for hybrid vehicles: The challenge of the SAE HEV task force.** Penney, T. (National Renewable Energy Lab., Golden, CO (United States)); Christensen, D.; Poulos, S. National Renewable Energy Lab., Golden, CO (United States). Nov 1994. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC36-83CH10093. (CONF-9410256–2: Society of Automotive Engineers' convergence '94, Detroit, MI (United States), 18-27 Oct 1994). Order Number DE95000280. Source: OSTI; NTIS; GPO Dep.

In 1992, the Society of Automotive Engineers (SAE) established a task force to develop a procedure for measuring electric energy consumption, all-electric range, fuel economy, and exhaust emissions for hybrid vehicles; the procedure will be submitted to regulatory agencies as representing the automotive industry's recommendations. The draft procedure is currently being tested on hybrid vehicles. The University of Maryland's parallel hybrid was tested in September 1994, and the University of California-Davis' parallel hybrid and the University of Illinois' series hybrid will be tested in November 1994 and January 1995, respectively. The procedure is being modified to incorporate any lessons learned, and the task force hopes to recommend the final procedure to the SAE by mid 1995.

3307 Emission Control

8063 (LBL–36383) **Carbon monoxide oxidation over three different states of copper: Development of a model metal oxide catalyst.** Jernigan, G.G. (California Univ., Berkeley, CA (United States). Dept. of Chemistry). Lawrence Berkeley Lab., CA (United States). Oct 1994. 200p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00098. Order Number DE95004682. Source: OSTI; NTIS; GPO Dep.

Carbon monoxide oxidation was performed over the three different oxidation states of copper – metallic (Cu), copper (I) oxide (Cu_2O), and copper (II) oxide (CuO) as a test case for developing a model metal oxide catalyst amenable to study by the methods of modern surface science and catalysis. Copper was deposited and oxidized on oxidized supports of aluminum, silicon, molybdenum, tantalum, stainless steel, and iron as well as on graphite. The catalytic activity was found to decrease with increasing oxidation state ($Cu > Cu_2O > CuO$) and the activation energy increased with increasing oxidation state (Cu, 9 kcal/mol < Cu_2O, 14 kcal/mol < CuO, 17 kcal/mol). Reaction mechanisms were determined for the different oxidation states. Lastly, NO reduction by CO was studied. A Cu and CuO catalyst were exposed to an equal mixture of CO and NO at 300–350 C to observe the production of N_2 and CO_2. At the end of each reaction, the catalyst was found to be Cu_2O. There is a need to study the kinetics of this reaction over the different oxidation states of copper.

8064 (NREL/TP–425-6722) **Development of a dedicated ethanol ultra-low emission vehicle (ULEV) system design.** Bourn, G. (Southwest Research Inst., San Antonio, TX (United States)); Callahan, T.; Dodge, L.; Mulik, J.; Naegeli, D.; Shouse, K.; Smith, L.; Whitney, K. National Renewable Energy Lab., Golden, CO (United States); Southwest Research Inst., San Antonio, TX (United States). Feb 1995. 90p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC36-83CH10093. Order Number DE95004016. Source: OSTI; NTIS; GPO Dep.

The objective of this 3.5 year project is to develop a commercially competitive vehicle powered by ethanol (or ethanol blend) that can meet California's ultra-low emission vehicle (ULEV) standards and equivalent corporate average fuel economy (CAFE) energy efficiency for a light-duty passenger car application. The definition of commercially competitive is independent of fuel cost, but does include technical requirements for competitive power, performance, refueling times, vehicle range, driveability, fuel handling safety, and overall emissions performance. This report summarizes a system design study completed after six months of effort on this project. The design study resulted in recommendations for ethanol-fuel blends that shall be tested for engine low-temperature cold-start performance and other criteria. The study also describes

three changes to the engine, and two other changes to the vehicle to improve low-temperature starting, efficiency, and emissions. The three engine changes are to increase the compression ratio, to replace the standard fuel injectors with fine spray injectors, and to replace the powertrain controller. The two other vehicle changes involve the fuel tank and the aftertreatment system. The fuel tank will likely need to be replaced to reduce evaporative emissions. In addition to changes in the main catalyst, supplemental aftertreatment systems will be analyzed to reduce emissions before the main catalyst reaches operating temperature.

3308 Alternative Fuels

Refer also to citation(s) 7123, 8064

8065 (NEI-SE–186) **Scenarios for introduction of bioethanol.** Elam, N. (Atrax Energi AB, Goeteborg (Sweden)). Swedish Transport and Communications Research Board, Stockholm (Sweden). May 1994. 157p. (In Swedish). Order Number DE95737666. Source: OSTI; NTIS.

This report discusses in a 10 year perspective some different approaches to continue introducing ethanol as an automotive fuel in Sweden, and tries to elucidate the costs and environmental effects of such introduction alternatives. Ethanol can be used in pure, or almost pure form, or in different blends with conventional automotive fuels. For pure alcohol propulsion of otto- or diesel engines it is in most cases necessary to introduce new or modified engine constructions. In a short perspective and for a faster introduction there are the fuel-mix and low-blend alternatives. This means fuel-mixes that can be utilized in existing engines, without need for rebuilding or adjusting of the engines. The study concerns a possible developing program to the year 2005 for production capacity within Sweden, from raw materials and technology we now knows comparatively well. 46 refs, 12 figs, 40 tabs

35 ARMS CONTROL

3501 Policy, Negotiations, and Legislation

8066 (ANL/DIS/CP–84533) **Fourth and Fifth Amendment issues raised by Chemical Weapons Convention inspections.** Tanzman, E.A. (Argonne National Lab., IL (United States). Economics and Law Section). Argonne National Lab., IL (United States). 21 Oct 1994. 13p. Sponsored by USDOE, Washington, DC (United States);Department of Defense, Washington, DC (United States). DOE Contract W-31109-ENG-38. Contract DNA001-90-C-0177. (CONF-9410265–1: Continuing legal education seminar on legal implications for business of the chemical weapons convention, Philadelphia, PA (United States), 21 Oct 1994). Order Number DE95004600. Source: OSTI; NTIS; GPO Dep.

The Chemical Weapons Convention (CWC) offers a unique challenge to the United States system of constitutional law. This discussion is about the Fourth and Fifth Amendment issues raised by the CWC and about how federal implementing legislation can allow verification inspections to take place in the United States under the Chemical Weapons Convention while remaining in compliance with the Constitution. By implementing legislation, the author means a federal statute that would be enacted separately from Senate approval of the Convention itself. Although implementing legislation is a relatively unusual accompaniment to a treaty, it will be necessary to the CWC, and the Administration has submitted a bill that was under consideration in the last Congress and presumably will be reintroduced early next year. The Fourth and Fifth Amendment problems posed by the CWC arise from the verification inspection scheme embodied in the treaty. The CWC depends heavily on on-site inspections to verify compliance with its key requirements. These include destroying all chemicals weapons stockpiles and bringing potential chemical weapons precursors under international control. The Convention contains four distinct kinds of inspections: systematic inspections of chemical weapons storage and destruction facilities, routine inspections of various declared facilities, challenge inspections, and a variant on challenge inspections in cases of alleged use of chemical weapons. All inspections are supposed to be only as intrusive as necessary to carry out the Convention. These inspections will be carried out by inspectors employed by the Organization for the Prohibition of Chemical Weapons (OPCW), located in The Hague, which is responsible for enforcing the Convention. Generally, the inspected State Party is permitted to assign observers to accompany the inspectors.

8067 (ANL/DIS/CP–84908) **Legal aspects of national implementation of the Chemical Weapons Convention.** Tanzman, E.A. (Argonne National Lab., IL (United States)); Zeuli, A.R.; Kellman, B. Argonne National Lab., IL (United States). 28 Nov 1994. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9411163–1: Regional seminar on the national implementation of the chemical weapons convention, Jakarta (Indonesia), 28 Nov 1994). Order Number DE95004635. Source: OSTI; NTIS; GPO Dep.

The author discusses some legal aspects of measures at the national level to implement the Chemical Weapons Convention (CWC). These implementing measures are universal, applying not only to the few States Parties that will declare and destroy chemical weapons, but also to the many States Parties that have never had a chemical weapons program. This new need for national measures to implement multilateral arms control agreements has generated unease due to a perception that implementation may be burdensome and at odds with national law. In 1993, concerns arose that the complexity of integrating the treaty with national law would cause each nation to effectuate the Convention without regard to what other nations were doing, thereby engendering significant disparities in implementation steps among States Parties. The author discusses progress among several States in actually developing national CWC implementing measures. Implementing measures from Australia, Norway, South Africa, and Sweden were available to him in English through the PTS. He compares them in order to illustrate different approaches to national implementation that are emerging. Of course, it is important to note that this brief survey necessarily omitted examination of the existing "background" of other, related domestic laws that these signatories might also have adopted that affect CWC implementation.

8068 (UCRL-LR–114070-7) **Director's series on proliferation.** Bailey, K.C.; Price, M.E. (eds.). Lawrence Livermore National Lab., CA (United States). 27 Dec 1994. 56p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. Order Number DE95005655. Source: OSTI; NTIS; GPO Dep.

The Director's Series on Proliferation is an occasional publication of essays on the topics of nuclear, chemical, biological, and missile proliferation. The seven papers presented in this issue cover the following topics: Should the Treaty on the Nonproliferation of Nuclear Weapons (NPT) be amended?; NPT extension - Legal and procedural issues; An Indonesian view of NPT review conference issues; The treaty of Tlatelolco and the NPT - Tools for peace and development; Perspectives on cut-off, weapons dismantlement, and security assurances; Belarus and NPT challenges; A perspective on the chemical weapons convention - Lessons learned from the preparatory commission.

3502 Proliferation

Refer also to citation(s) 7882, 8068

3503 Verification

Refer also to citation(s) 8066, 8419, 8429

36 MATERIALS

8069 (DOE/ER/45201–T2) **Microstructural behavior of nonequilibrium systems. Final report, March 1, 1986–May 31, 1993.** Li, J.C.M. Rochester Univ., NY (United States). Dept. of Mechanical Engineering. Nov 1994. 16p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-85ER45201. Order Number DE95004450. Source: OSTI; NTIS; GPO Dep.

The major achievements made during this period are as follows: (1) negative creep in metallic glasses and mechanochemical spinodal decomposition; (2) magnetic domain structure at shear bands and annealing embrittlement of metallic glasses; (3) etch pits along shear bands in metallic glasses; (4) increase of Curie temperature by rapid heating; (5) molecular dynamics simulation of melting; (6) nanoporous materials; (7) dislocation-crack interactions; (8) recovery processes of deformed structure; and (9) differences in deformation mechanisms between metals and polymers. A brief discussion is given for each achievement.

3601 Metals and Alloys

Refer also to citation(s) 7296, 7587, 7590, 7693, 7698, 7928, 8121, 8327, 8332, 8971, 8983, 9091, 9092, 9093

8070 (ANL/ET/CP–82012) **Swelling and structure of vanadium-base alloys irradiated in the dynamic helium charging experiment.** Chung, H.M.; Loomis, B.A.; Smith, D.L. Argonne National Lab., IL (United States). Aug 1994. 15p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-940657–8: 17. symposium on effects of radiation on materials, Sun Valley, ID (United States), 20-23 Jun 1994). Order Number DE95004659. Source: OSTI; NTIS; INIS; GPO Dep.

Combined effects of dynamically charged helium and neutron damage on density change, void distribution, and microstructural evolution of V-4Cr-4Ti alloy have been determined after irradiation to 18–31 dpa at 425–600 C in the Dynamic Helium Charging Experiment (DHCE), and the results were compared with those from a non-DHCE in which helium generation and negligible. For specimens irradiated to ≈18-31 dpa at 500–600 with a helium generation rate of 0.4–4.2 appm He/dpa, only a few helium bubbles were observed at the interface of grain matrices and some of the Ti(O,N,C) precipitates, and no microvoids or helium bubbles were observed either in grain matrices or near grain boundaries. Under these conditions, dynamically produced helium atoms seem to be trapped in the grain matrix without significant bubble nucleation or growth, and in accordance with this, density changes from DHCE and non-DHCE (negligible helium generation) were similar for comparable fluence and irradiation temperature. Only for specimens irradiated to ≈31 dpa at 425 C, when helium was generated at a rage of 0.4–0.8 appm helium/dpa, were diffuse helium bubbles observed in limited regions of grain matrices and near ≈15% of the grain boundaries in densities significantly lower than those in the extensive coalescences of helium bubbles typical of other alloys irradiated in tritium-trick experiments. Density changes of specimens irradiated at 425 C in the DHCE were significantly higher than those from non-DHCE irradiation. Microstructural evolution in V-4Cr-4Ti was similar for DHCE and non-DHCE except for helium bubble number density and distribution. As in non-DHCE, the irradiation-induced precipitation of ultrafine Ti_5Si_3 was observed for DHCE at >500 C but not at 425 C.

8071 (ANL/MSD/PP–82718) **Epitaxial growth of bcc transition metal films and superlattices onto MgO (111), (011) and (001) substrates.** Mattson, J.E.; Fullerton, E.E.; Sowers, C.H.; Bader, S.D. Argonne National Lab., IL (United States). Apr 1994. 24p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. Order Number DE95004629. Source: OSTI; NTIS; GPO Dep.

We demonstrate epitaxial growth of the bcc transition metals Nb, Mo, Fe, and Cr via sputtering onto single crystal MgO substrates. The epitaxial growth orientations are (011), (112) and (001) when grown onto MgO (111), (011) and (001), respectively. Further we demonstrate that under appropriate growth conditions, superlattices of these materials (e.g., Fe/Cr, Fe/V and Mo/V) can be grown with the same epitaxial order as the films.

8072 (BNL–61136) **A study of the electrochemical behavior in tungsten and caustic solutions and platinum/iridium in chloride solutions, informal report.** Vitus, C.M. (Brookhaven National Lab., Upton, NY (United States)); Isaacs, H.S.; Schroeder, V. Brookhaven National Lab., Upton, NY (United States). 22 Nov 1994. 27p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. Order Number DE95004951. Source: OSTI; NTIS; GPO Dep.

Platinum/iridium and tungsten wires were electronically etched in chloride and caustic solution, respectively, to produce tips with high aspect ratio. A direct relationship between the meniscus and the aspect ratio of etched tips was established. Scanning electron micrographs indicated that higher aspect ratios were obtained by changing the geometry of the meniscus during the etch either by an increase in the applied a.c. voltage or with the addition of a nonpolar layer above the electrolytic solution during the etching process. Above the breakdown voltage, two possible mechanisms appeared to control the etching process by expediting chemical dissolution: cavitation and sparking. Cavitation caused erosion due to the force of evolved gases against the electrode and sparking attacked the surface by vaporizing the metal. Sparking commenced on both wires near 24V. This voltage corresponded to a minimum in the plot of total etch time versus voltage. From light emission studies, sparking on Pt/Ir was associated with the ionization of Pt, Ir, Ca, and Cl. A compositional analysis of insoluble black particles produced during a.c. and d.c. etching of Pt/Ir revealed Pt and Ir as the major constituents of the product. The sparking process was shown to have a potential use in micromachining.

8073 (CEA-R–5572) **Study of point defects and matter transport in cubic face centered concentrated alloys.** Hersant, D. CEA Centre d'Etudes de Saclay, 91 - Gif-sur-Yvette (France). Dept. de Technologie des Materiaux. Jan 1991. 246p. (In French). Order Number DE95612035. Source: OSTI; NTIS (US Sales Only); INIS.

It is shown that the second moment approximation to the tight binding method allows a functional to be set up which describes transition metals, noble metals and their alloys. It is assumed that the local electronic density of states is rectangular and that the width varies from site to site. It is then shown how the Monte Carlo method can be used to study order in solid solution with a large difference in size between components: atoms of different nature are exchanged and their neighbours are simultaneously displaced in accordance with the microscopic theory of elasticity. The phase diagram of the simulated alloys is then constructed. Experimental results are qualitatively well reproduced but transition temperatures are difficult to evaluate accurately because of a bad estimation of the vibration entropy. A local tendency towards ordering due to chemical effects is shown at the defect proximity. 40 figs., 100 refs.

8074 (CEA-R–5654) **Ordered compounds under irradiation: dynamical equilibrium phase diagrams and microstructural evolutions.** Soisson, F. CEA Centre d'Etudes de Saclay, 91 - Gif-sur-Yvette (France). Dept. de Technologie des Materiaux. Oct 1993. 169p. (In French). Order Number DE95615149. Source: OSTI; NTIS (US Sales Only); INIS.

The diffusion in an ordered alloy under irradiation is modelled on a rigid lattice with two atomic exchange mechanisms acting in parallel: thermally activated and forced jumps. Two descriptions are proposed and applied to the A2-B2 disorder-order transition in bcc compounds: a deterministic kinetic method in the Bragg-Williams approximation and Monte Carlo simulations. Dynamical equilibrium phase diagrams under irradiation are built; microstructural evolutions are studied: a new mechanism for irradiation induced elimination of antiphase boundaries is identified as well as the various dissolution modes of ordered precipitates. The shift from second to first order of the A2-B2 transition, predicted by the model, has been experimentally checked by 1 MeV electron irradiations of a FeAl alloy. 60 figs., 135 refs.

8075 (CONF-941016–5) **Synthesis of Ni_3Al and NiAl intermetallics.** Sikka, V.K. (Oak Ridge National Lab., TN (United States)); Cooper, R. Oak Ridge National Lab., TN (United States). [1994]. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. From Materials week '94; Rosemont, IL (United States); 3-7 Oct 1994. Order Number DE95005897. Source: OSTI; NTIS; GPO Dep.

Intermetallics are an attractive class of advanced materials. The aluminide intermetallics offer advantages including: (1) lower density, (2) oxidation resistance, (3) carburization resistance, and (4) interesting mechanical properties because of their ordered crystal structure. Even though the attractive properties of the aluminides

and other intermetallics have been known for nearly four decades, their practical applications have not been developed for two reasons: (1) poor ductility (in some cases at both ambient and high temperatures) and (2) lack of processability into meaningful components. Recent advances such as ductilization of Ni_3Al by small additions of born and the knowledge that environmental effects are the major cause of poor ductility in Fe_3Al and FeAl systems have brought the intermetallics into the forefront of research and their commercial applications. This paper describes a method for melting Ni_3Al-based alloys that successfully utilize the exotherm for formation of NiAl from elemental materials. The reaction-synthesis method has also been utilized for the production of NiAl and NiAl-based alloy powders from the elemental powders. Reaction-synthesized powders of NiAl and NiAl-based alloys were consolidated by hot extrusion and evaluated for tensile properties over a temperature range from room temperature to 1050 C. The powder-processing conditions have been found to have more influence on the ductile-to-brittle transition temperature of NiAl than the powder- production method.

8076 (CONF-941144–53) **Time dependent indentation testing at non-ambient temperatures utilizing the high temperature mechanical properties microprobe.** Lucas, B.N. (Oak Ridge National Lab., TN (United States)); Oliver, W.C. Oak Ridge National Lab., TN (United States). [1994]. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. From 1994 fall meeting of the Materials Research Society (MRS); Boston, MA (United States); 28 Nov - 2 dec 1994. Order Number DE95005895. Source: OSTI; NTIS; GPO Dep.

Time dependent indentation data for pure indium from −100°C to 75°C is presented. The properties reported include hardness, indentation strain rate, stress exponent and apparent activation energy for creep. These properties were measured using a depth-sensing indentation system capable of performing experiments between −100°C and 300°C in ultra-high vacuum. In addition, by employing laser interferometric techniques, this system can obtain displacement data with time constants as low as 50 ns. This allows the investigation of the material response to very fast stress changes over an extremely wide range of strain rates. The adverse and beneficial dynamic effects of step-loading the indenter into the surface of the material will be discussed. Initial results obtained from this type of experiment show that it is possible to obtain energy dissipation or damping information from the material being studied.

8077 (CONF-950110–17) **Process monitoring using a Quality and Technical Surveillance Program.** Rafferty, C.A. Oak Ridge Y-12 Plant, TN (United States). [1995]. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. From 12. symposium on space nuclear power and propulsion; Albuquerque, NM (United States); 8-12 Jan 1995. Order Number DE95005896. Source: OSTI; NTIS; INIS; GPO Dep.

The purpose of process monitoring using a Quality and Technical Surveillance Program was to help ensure manufactured clad vents sets fully met technical and quality requirements established by the manufacturer and the customer, and that line and program management were immediately alerted if any aspect of the manufacturing activities drifted out of acceptable limits. The Quality and Technical Surveillance Program provided a planned, scheduled approach to monitor key processes and documentation illuminated potential problem areas early enough to permit timely corrective actions to reverse negative trends that, if left uncorrected, could have resulted in deficient hardware. Significant schedule and cost impacts were eliminated.

8078 (DOE/PC/92542–T8) **Robotic weld overlay coatings for erosion control. Quarterly technical progress report, July–September, 1994.** Levin, B.F.; Dupont, J.N.; Marder, A.R. Lehigh Univ., Bethlehem, PA (United States). Energy Research Center. 26 Oct 1994. 41p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-92PC92542. Order Number DE95005187. Source: OSTI; NTIS; GPO Dep.

Research is presently being conducted to develop a criteria for selecting weld overlay coatings for erosion mitigation in Circulated Fluidized Beds. Initially, eleven weld overlay alloys were selected for erosion testing based upon a literature review. All eleven coatings were deposited on 1018 steel substrates using the plasma arc welding process. Ten samples from each coating were prepared for erosion testing. All selected coatings were erosion tested at 400 C and their erosion resistance was evaluated by determining the steady state erosion rate. In addition, the microstructure of each coating was characterized before and after the erosion tests. No correlations were found between room temperature hardness of the weld overlay coatings and their erosion resistance at elevated temperature. It was suggested that weld overlays mechanical properties such as fracture strength, toughness and work hardening rates may contributed to their erosion resistance. During the previous two quarters the microhardness tests were performed on the eroded samples in order to determine the size of the work hardened zone and the change in the coatings hardness due to erosion. As a result of these measurements it was established that one group of coatings deformed plastically, while another did not. In addition, the measurements of the weld overlays microhardness at 400 C were made. The coatings microhardness at 400 C was plotted versus their volume erosion rates. During the last quarter, erosion tests were performed for Inconel-625, 316L SS, and Iron-Aluminide wrought alloys in order to compare their erosion behavior with similar weld overlays. The results of microhardness profile measurements for all weld overlay coatings were analyzed. The factors that contribute to the erosion resistance of the coatings that deformed plastically are discussed in this progress report.

8079 (GKSS–93/E/78) **Simulation and stability testing of the fuzzy control of an implant welding unit.** Blidung, T. Technische Univ. Hamburg-Harburg, Hamburg (Germany). 1993. 112p. (In German). Order Number DE95738841. Source: OSTI; NTIS (US Sales Only).

Non-linear or processes disturbed by noise demand new concepts of controlling. The aim is to control despite the non-linearity or minimize the influence of noise, respectively. In many cases the use of Fuzzy-Logic seems to be a reasonable solution. Many successes increase the research done on the field during recent times. The subject of this paper is to develop a controller in order to control the electrode spacing of an arc, and to show the stability of the controlled plant. The aim is to proof that the feed back control system is able to control the arc. The proof is done on the base of quantity and quality models as well. All Fuzzy-Logic calculations are done by a micro-controller made by Togai. Quantity simulations are used to check the stability of the process by changing its parameters. It is shown that the quality modelling and controlling keep the arc at its working area with a sufficient probability of success for practical use. (orig.)

8080 (GKSS–94/E/32) **Local quantitative phase analysis of two-phase TiAl(Cr)-alloys by analytical transmission electron microscopy.** Pfullmann, T. GKSS-Forschungszentrum Geesthacht GmbH (Germany). Inst. fuer Werkstofforschung; Technische Univ. Hamburg-Harburg, Hamburg (Germany). 1994. 167p. (In German). Order Number DE95738115. Source: OSTI; NTIS (US Sales Only).

Two-phase TiAl(Cr)-alloys with a composition of 48 at.%Al have been investigated as potential low density high temperature materials. The tetragonality of the γ-phase, which may strongly influence the mechanical properties of the alloys, was determined with high precision and spatial resolution. For this it was necessary to improve the accuracy of analytical electron microscopy methods (EDX, HOLZ line analysis). The results show a variation of Al-content among γ-TiAl lamellae within one specimen and a linear relationship between lattice parameters and composition. The results of heat treatments in two-phase regions and the influence of chromium are presented in detail and discussed with respect to the mechanical properties. (orig.)

8081 (IA–1486, pp. 52-53) **$UCoNiGe_2$ nonmagnetic solid solution of the antiferromagnets UCo_2Ge_2 and UNi_2Ge_2.** Kuznietz, M.; Bouree, F.; Pinto, H.; Melamud, M. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. INTERMETALLIC COMPOUNDS/antiferromagnetic materials; URANIUM COMPOUNDS/intermetallic

compounds; URANIUM COMPOUNDS/space groups; BCC LATTICES; COBALT COMPOUNDS; GERMANIUM COMPOUNDS; NICKEL COMPOUNDS; SOLID SOLUTIONS; TETRAGONAL LATTICES; X-RAY DIFFRACTION

8082 (IA–1486, pp. 57-58) **Coexistence of three commensurate magnetic phases in the solid solution $U(Ni_{0.25}Cu_{0.75})_2Si_2$, observed by neutron diffraction.** Kuznietz, M.; Andre, G.; Bouree, F.; Pinto, H.; Ettedgui, H.; Melamud, M. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. URANIUM ALLOYS/phase studies; BCC LATTICES; COPPER ALLOYS; CRYSTAL-PHASE TRANSFORMATIONS; FERRIMAGNETIC MATERIALS; NEUTRON DIFFRACTION; NICKEL ALLOYS; SILICON ALLOYS; SOLID SOLUTIONS; SPACE GROUPS; TETRAGONAL LATTICES

8083 (IA–1486, pp. 58) **Defect structure and superconducting properties of $La_{1.8}Sr_xCa_{1.2-x}Cu_2O_{6-\delta}$.** Shaked, H.; Jorgensen, J.D.; Hunter, B.A.; Hitterman, R.L.; Kinishita, K.; Izumi, F.; Kamiyama, T. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. CHALCOGENIDES/superconductivity; HIGH-TC SUPERCONDUCTORS/superconductivity; CHALCOGENIDES; SUPERCONDUCTIVITY; CONCENTRATION RATIO; CRYSTAL DEFECTS; CRYSTAL LATTICES; HIGH PRESSURE; NEUTRON DIFFRACTION; OXYGEN; POWDERS; SAMPLE PREPARATION; TEMPERATURE RANGE 0013-0065 K

8084 (IA–1486, pp. 75-76) **$LaNi_5$ in a copper matrix.** Moreno, D.; Harris, I.R. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. LANTHANUM ALLOYS/physical metallurgy; NICKEL ALLOYS/physical metallurgy; ABSORPTION; COMPOSITE MATERIALS; COPPER; DUCTILITY; HYDROGEN; HYDROGENATION; INTERMETALLIC COMPOUNDS; POWDER METALLURGY; SINTERED MATERIALS; SINTERING; X-RAY DIFFRACTION

8085 (IA–1486, pp. 77) **Blister model based on near-surface helium concentration on implanted metals.** Moreno, D.; Eliezer, D. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. COPPER BASE ALLOYS/metallography; BERYLLIUM ADDITIONS; BLISTERS; BUBBLE GROWTH; METALLOGRAPHY; CRYSTAL LATTICES; HELIUM; IMAGE PROCESSING; ION IMPLANTATION; MECHANICAL PROPERTIES; SCANNING ELECTRON MICROSCOPY; SURFACES; TEMPERATURE DEPENDENCE; THERMOMECHANICAL TREATMENTS

8086 (IA–1486, pp. 79-80) **The influence of preferred crystallographic orientation on blister size distribution in helium implanted surfaces.** Zalkind, S.; Lempert, G.D.; Moreno, D. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. ALUMINIUM/interstitial helium generation; BERYLLIUM ALLOYS/interstitial helium generation; COPPER ALLOYS/interstitial helium generation; ALUMINIUM; ANNEALING; BLISTERS; CRYSTAL LATTICES; CRYSTALLOGRAPHY; CRYSTALS; DOSE RATES; GRAIN ORIENTATION; HELIUM IONS; HELIUM 4 BEAMS; ION BEAM TARGETS; ION IMPLANTATION; MECHANICAL PROPERTIES; SAMPLE PREPARATION; SURFACE PROPERTIES

8087 (IA–1486, pp. 88) **Shear-like transformation in dilute U-W alloys.** Dayan, D.; Beeri, O.; Herrmann, B.; Landau, A.; Zahavi, A.; Livne, Z.; Kimmel, G. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. URANIUM BASE ALLOYS/crystal-phase transformations; BINARY ALLOY SYSTEMS; CRYSTALLOGRAPHY; ELECTRON PROBES; INTERMETALLIC COMPOUNDS; OPTICAL MICROSCOPY; SCANNING ELECTRON MICROSCOPY; TUNGSTEN ADDITIONS; X-RAY DIFFRACTION

8088 (INIS-mf–14440, pp. 12) **The study of free electrons role on creation of magnetic phases in intermetallic compounds of Gd Al_2, Gd_2 In, and La_2 Al.** Zaker, A.; Nadooshan, M.N. Iranian Physics Society, Teheran (Iran, Islamic Republic of); Iran Univ. of Science and Technology, Teheran (Iran, Islamic Republic of). Aug 1994. 91p. (In English, Persian). (CONF-9408203–: Annual physics conference of Iran, Sanandaj (Iran, Islamic Republic of), 19 Aug - 1 sep 1994). In *Abstracts of annual physics conference of Iran, 1373 Kordestan University.* Order Number DE95611717. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. ALUMINATES/electric conductivity; GADOLINIUM COMPOUNDS/electric conductivity; INDIUM COMPOUNDS/electric conductivity; LANTHANUM COMPOUNDS/electric conductivity; ALUMINATES; ELECTRONS; INTERMETALLIC COMPOUNDS; MAGNETISM; TEMPERATURE RANGE 0065-0273 K; TEMPERATURE RANGE 0273-0400 K

8089 (INIS-RU–377, pp. 82) **High intensity ion implantation: method of nitride phase formation.** Bojko, E.B.; Komarov, A.F.; Tarkovskij, P.; Fedotov, S.A. AN SSSR, Moscow (Russian Federation); Moskovskij Gosudarstvennyj Univ., Moscow (Russian Federation). Nauchno-Issledovatel'skij Inst. Yadernoj Fiziki. 1993. 148p. (In Russian). (CONF-9305364–: 23. International meeting on the physics of charged particle interaction with crystals, Moscow (Russian Federation), 31 May - 2 jun 1993). In *Thesies of the proceedings of the 23. International meeting on the physics of charged particle interaction with crystals.* Order Number DE94631501. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. LOW ALLOY STEELS/ion implantation; LOW ALLOY STEELS/radiation effects; CHEMICAL REACTION KINETICS; DIFFUSION; IRON NITRIDES; MATHEMATICAL MODELS; NITROGEN IONS; SIMULATION; SPATIAL DISTRIBUTION

8090 (INIS-RU–377, pp. 86) **Changes in structure and properties of amorphous metallic alloys under ion irradiation.** Prilepo, V.L.; Kazak, L.A.; Glazer, A.A.; Charikova, N.I.; Belykh, T.A.; Semyannikov, V.E. AN SSSR, Moscow (Russian Federation); Moskovskij Gosudarstvennyj Univ., Moscow (Russian Federation). Nauchno-Issledovatel'skij Inst. Yadernoj Fiziki. 1993. 148p. (In Russian). (CONF-9305364–: 23. International meeting on the physics of charged particle interaction with crystals, Moscow (Russian Federation), 31 May - 2 jun 1993). In *Thesies of the proceedings of the 23. International meeting on the physics of charged particle interaction with crystals.* Order Number DE94631501. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. 3 refs. COBALT BASE ALLOYS/coercive force; COBALT BASE ALLOYS/physical radiation effects; IRON BASE ALLOYS/coercive force; IRON BASE ALLOYS/physical radiation effects; ANALYTICAL SOLUTION; METALLIC GLASSES; MEV RANGE 10-100; NITROGEN IONS; RADIATION DOSES; TEMPERATURE RANGE 0065-0273 K

8091 (INIS-RU–377, pp. 88) **Study of nitrided titanium.** Gordeeva, G.V.; Guseva, M.I.; Danelyan, L.S.; Egorova, I.M.; Kulikauskas, V.S. AN SSSR, Moscow (Russian Federation); Moskovskij Gosudarstvennyj Univ., Moscow (Russian Federation). Nauchno-Issledovatel'skij Inst. Yadernoj Fiziki. 1993. 148p. (In Russian). (CONF-9305364–: 23. International meeting on the physics of charged particle interaction with crystals, Moscow (Russian Federation), 31 May - 2 jun 1993). In *Thesies of the proceedings of the 23. International meeting on the physics of charged particle interaction with crystals.* Order Number DE94631501. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. 1 fig. TITANIUM BASE ALLOYS/ion implantation; TITANIUM BASE ALLOYS/wear resistance; ALUMINIUM ALLOYS; MICROHARDNESS; NITROGEN IONS; PHYSICAL RADIATION EFFECTS

8092 (INIS-RU–377, pp. 89) **The model of radiation-induced crystallization and amorphous layer growth in semiconductors under light ion irradiation.** Kotov, A.V.; Titov, A.I. AN SSSR, Moscow (Russian Federation); Moskovskij Gosudarstvennyj Univ., Moscow (Russian Federation). Nauchno-Issledovatel'skij Inst. Yadernoj Fiziki. 1993. 148p. (In Russian). (CONF-9305364–: 23. International meeting on the physics of charged particle interaction with crystals, Moscow (Russian Federation), 31 May - 2 jun 1993). In *Thesies of the proceedings of the 23. International meeting on the physics of charged particle interaction with crystals.* Order Number DE94631501. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. SEMICONDUCTOR MATERIALS/physical radiation effects; AMORPHOUS STATE; COMPUTERIZED SIMULATION; CRYSTALLIZATION; DOSE-RESPONSE RELATIONSHIPS; INTERFACES; ION IMPLANTATION; LIGHT IONS; RADIATION DOSES; SEMICONDUCTOR JUNCTIONS

8093 (INIS-RU–377, pp. 91) **Layer-by-layer analysis of chemical composition at the interface of Fe-Pd structure irradiated with Xe^+ ions.** Tashlykov, I.S.; Bobrovich, O.G.; Vol'f, G.; Kal'bittser, Z.; Ehnders, B. AN SSSR, Moscow (Russian Federation); Moskovskij Gosudarstvennyj Univ., Moscow (Russian Federation). Nauchno-Issledovatel'skij Inst. Yadernoj Fiziki. 1993. 148p. (In Russian). (CONF-9305364–: 23. International meeting on the physics of charged particle interaction with crystals, Moscow (Russian Federation), 31 May - 2 jun 1993). In *Thesies of the proceedings of the 23. International meeting on the physics of charged particle interaction with crystals.* Order Number DE94631501. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. INTERFACES/chemical composition; INTERFACES/physical radiation effects; IRON/substrates; PALLADIUM/vapor deposited coatings; FLUX DENSITY; INTERFACES; IRON; SUBSTRATES; KEV RANGE 10-100; PALLADIUM; RADIATION DOSES; RADIATION FLUX; SPUTTERING; XENON IONS

8094 (INIS-RU–377, pp. 95) **Modification of properties in proton implanted silicon under heat treatment.** Ehmeksuzyan, V.M.; Bolotov, V.V.; Plotnikov, G.L.; Vologdin, Eh.N. AN SSSR, Moscow (Russian Federation); Moskovskij Gosudarstvennyj Univ., Moscow (Russian Federation). Nauchno-Issledovatel'skij Inst. Yadernoj Fiziki. 1993. 148p. (In Russian). (CONF-9305364–: 23. International meeting on the physics of charged particle interaction with crystals, Moscow (Russian Federation), 31 May - 2 jun 1993). In *Thesies of the proceedings of the 23. International meeting on the physics of charged particle interaction with crystals.* Order Number DE94631501. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. 1 ref. SILICON/annealing; SILICON/ion implantation; DEFECTS; KEV RANGE 100-1000; PROTONS; RADIATION DOSES; SILICON; ANNEALING; TEMPERATURE RANGE 0400-1000 K

8095 (INIS-RU–377, pp. 96) **Mechanical properties of ion-alloyed boron-bearing materials.** Guldamashvili, A.I.; Kulikauskas, V.S.; Kuteliya, R.N.; Sadagashvili, M.I.; Bajramashvili, I.A.; Kekelidze, L.I. AN SSSR, Moscow (Russian Federation); Moskovskij Gosudarstvennyj Univ., Moscow (Russian Federation). Nauchno-Issledovatel'skij Inst. Yadernoj Fiziki. 1993. 148p. (In Russian). (CONF-9305364–: 23. International meeting on the physics of charged particle interaction with crystals, Moscow (Russian Federation), 31 May - 2 jun 1993). In *Thesies of the proceedings of the 23. International meeting on the physics of charged particle interaction with crystals.* Order Number DE94631501. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. 2 refs. ALUMINIUM BORIDES/microhardness; ALUMINIUM BORIDES/physical radiation effects; BORON/microhardness; BORON/physical radiation effects; BORON CARBIDES/microhardness; BORON CARBIDES/physical radiation effects; MICROHARDNESS; BORON; HELIUM IONS; INTERSTITIALS; LITHIUM IONS; VACANCIES

8096 (INIS-RU–377, pp. 98) **Modification of high-chromium die steel by ion alloying.** Uglov, V.V.; Khodasevich, V.V.; Kutsanov, V.A.; Cherenda, N.N. AN SSSR, Moscow (Russian Federation); Moskovskij Gosudarstvennyj Univ., Moscow (Russian Federation). Nauchno-Issledovatel'skij Inst. Yadernoj Fiziki. 1993. 148p. (In Russian). (CONF-9305364–: 23. International meeting on the physics of charged particle interaction with crystals, Moscow (Russian Federation), 31 May - 2 jun 1993). In *Thesies of the proceedings of the 23. International meeting on the physics of charged particle interaction with crystals.* Order Number DE94631501. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. STEEL-CR12MOV/ion implantation; DOSE-RESPONSE RELATIONSHIPS; FRICTION; MICROHARDNESS; MODIFICATIONS; NIOBIUM IONS; PHASE STUDIES; PHYSICAL RADIATION EFFECTS; RADIATION DOSES; STEEL-CR12MOV

8097 (INIS-RU–377, pp. 100) **Electron induced conductivity in argon ion implanted GaAs.** Kudyshev, A.N.; Zimens, V.A. AN SSSR, Moscow (Russian Federation); Moskovskij Gosudarstvennyj Univ., Moscow (Russian Federation). Nauchno-Issledovatel'skij Inst. Yadernoj Fiziki. 1993. 148p. (In Russian). (CONF-9305364–: 23. International meeting on the physics of charged particle interaction with crystals, Moscow (Russian Federation), 31 May - 2 jun 1993). In *Thesies of the proceedings of the 23. International meeting on the physics of charged particle interaction with crystals.* Order Number DE94631501. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. GALLIUM ARSENIDES/electric conductivity; GALLIUM ARSENIDES/ion implantation; ARGON IONS; DOSE-RESPONSE RELATIONSHIPS; ELECTRON BEAMS; FLUX DENSITY; KEV RANGE 100-1000; PHYSICAL RADIATION EFFECTS; RADIATION FLUX

8098 (INIS-RU–377, pp. 103) **Temperature dependence of microhardness for aluminium implanted with nickel ions.** Anyshchik, V.M.; Zhukova, S.I. AN SSSR, Moscow (Russian Federation); Moskovskij Gosudarstvennyj Univ., Moscow (Russian Federation). Nauchno-Issledovatel'skij Inst. Yadernoj Fiziki. 1993. 148p. (In Russian). (CONF-9305364–: 23. International meeting on the physics of charged particle interaction with crystals, Moscow (Russian Federation), 31 May - 2 jun 1993). In *Thesies of the proceedings of the 23. International meeting on the physics of charged particle interaction with crystals.* Order Number DE94631501. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. ALUMINIUM/microhardness; ALUMINIUM/physical radiation effects; ACTIVATION ENERGY; ALUMINIUM; MICROHARDNESS; DISLOCATIONS; ION IMPLANTATION; NICKEL IONS; TEMPERATURE DEPENDENCE; TEMPERATURE RANGE 0273-0400 K

8099 (KAERI/RR–1343/93) **Development of stainless steels for nuclear power plant - Advanced nuclear materials development -.** Hong, Jun Hwa (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Ryu, Woo Seog; Chi, Se Hwan; Lee, Bong Sang; Oh, Yong Jun; Byun, Thak Sang; Oh, Jong Myung. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jul 1994. 275p. (In Korean). Order Number DE95612019. Source: OSTI; NTIS; INIS.

This report reviews the status of R and D and the material specifications of nuclear components in order to develop the stainless steels for nuclear applications, and the technology of computer-assisted alloy design is developed to establish the thermodynamic data of Fe-Cr-Ni-Mo-Si-C-N system which is the basic stainless steel systems. High strength and corrosion resistant stainless steels, 316LN and super clean 347, are developed, and the manufacturing processes and heat treatment conditions are determined. In addition, a martensitic steel is produced as a model alloy for turbine blade, and characterized. The material properties showed a good performance for nuclear applications. (Author).

8100 (KAERI/RR–1346/93) **Development of metallic fuel materials -Development of the advanced nuclear materials-.** Kang, Young Ho (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Lee, Kang Il; Kim, Chang Kyu; Joo, Jea Oh; Lee, Chang Tak; Park, Hee Dea; Kim, Ki Hwan; Hwang, Sung Chan; Kim, Jung Do; Ann, Hyun Suk; Chang, Sae Jung; Joo, Keun Sik. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jul 1994. 149p. (In Korean). Order Number DE95612020. Source: OSTI; NTIS; INIS.

The melting and casting parameters has been investigated for obtaining the proper U-Zr alloy. So a sound alloy ingot was sucessfully prepared. The Zr yield with the respected to the charged raw material is about 85%. The Zr content variation along the ingot is ± 0.2 wt%. At that time the melt was hold for three minutes at 1600 deg C. The microstructure of U-Zr ingot has been found to consist of α U as a matrix and δ-UZr_2 as a coarse dispersion in the matrix. Additionally the U-Zr melt was rapidly solidified into powder by utilizing centrifugal atomizer. This powder tends to form fine and homogeneous microstructure. (Author).

8101 (KAERI/RR–1360/93) **Inconel alloys development - Development of the advanced nuclear materials-.** Kuk, Il Hiun (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Jang, Jin Sung; Rhee, Chang Kyu; Chung, Man Kyo; Woo, Yun Myeoung; Han, Chang Hee. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jul 1994. 106p. (In Korean). Order Number DE95612021. Source: OSTI; NTIS; INIS.

We surveyed the current status and problems in S/G U-tubes in Korea and worldwide. Also we gathered manufacturing specifications of S/G U-tubes and compared/analyzed the differences in them company by company. We produced alloy 600 tubes (in cooperation with Sammi Special Steels) through V.I.M. (Vacuum Induction Melting; 2 ton capacity), 4 steps of hot press forging, hot extrusion (10:1 of reduction ratio), 3 steps of cold pilgerings and so on. We will continue to characterize the tubes and 2nd time preproduce the tubes using the feed-back data. With regard to alloy 690, which is getting popular for S/G U-tubes worldwide, we cast four 60 Kg ingots and two 6 Kg ingots by V.I.M.. We analyzed the chemical composition, macrostructures, hot workability, and so on ; all ingots were good except on 60 Kg ingot. Finally we produced high quality alloy 690 ingot (about 1 Kg) by E.S.R. (Electroslag Remelting) method (in cooperation with Yeoungnam University). We used CaF/CaO/Al2O3/MgO quartenary slag system. We have made directionally grown good ingots by E.S.R. and especially the hot workability at 1100 deg C - the temperature at which V.I.M. ingots showed very poor hot workability - was very much improved (from 30 to 90 % of reduction of area). We continue to analyze the effects of E.S.R. to the structure and properties of alloy 690 (grain size, morphology, and directionality; any changes of inclusions and so on). (Author).

8102 (KFK–5353) **Metallurgical and mechanical tests on the low activating martensitic chromium steel OPTIFER-IV.** Schaefer, L. (Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Kernfusion); Kempe, H. Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Kernfusion; Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Materialforschung. Aug 1994. 28p. (In German). Order Number DE95738282. Source: OSTI; NTIS (US Sales Only); INIS.

Derived from a martensitic chromium-steel (1.4914) with high strength at elevated temperatures, a new low activating steel OPTIFER-IV, Chg. 986489, had been developed for an application as 'First Wall' - and as structural material for fusion devices. The alloying elements with high activation like Mo, Ni and Nb had been substituted by similar acting, but low activating elements like W and Ta. Some metallurgical and mechanical properties had been tested in order to decide the kind of alloying. The new steel is fully martensitic without δ-ferrite, fine-grained and well hardenable. The tensile properties satisfy the requirements, and the notch impact bending properties are excellent. (orig.)

8103 (LBL–34612) **New vision on surface diffusion.** Xiao, X.D. (Univ. of California, Berkeley, CA (United States). Dept. of Physics); Xie, Y.; Shen, Y.R. Lawrence Berkeley Lab., CA (United States). Aug 1993. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00098. (CONF-9308154–5: 4. international conference on the structure of surfaces, Shanghai (China), 16-19 Aug 1993). Order Number DE95004686. Source: OSTI; NTIS; GPO Dep.

Although surface diffusion has been a subject of extensive studies, its understanding is still rudimentary. The authors have recently developed a novel technique utilizing optical diffraction from a laser-induced one-dimensional monolayer grating to probe chemical surface diffusion. Since the diffusion involved is one-dimension, it can be easily analyzed. By varying the grating period, the measurable diffusion coefficient can have a dynamic range of about 9 orders of magnitude, from 10^{-6} cm^2/sec to 10^{-15} cm^2/sec. If the grating is properly oriented, anisotropic surface diffusion can be readily measured. Also the technique is applicable to both metals and semiconductors and probably even insulators of fluids. Finally, with linear optical diffraction, the sensitivity of the technique can be so high that a grating with a modulation of a few percent of a monolayer is easily detectable. Therefore, the coverage dependence of surface diffusion can also be investigated. The authors have used this technique to study CO diffusion on Ni(110). They are interested in: (1) the coverage dependence of anisotropic diffusion; (2) impurities effects on diffusion; and (3) defect effects on diffusion.

8104 **Structural alloy with a protective coating containing silicon or silicon-oxide.** Natesan, K. 1992. Filed date 30 Nov 1992. U.S. Patent Application 7-983,188. 17p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. Order Number DE95006121. Source: OSTI; NTIS (US Sales Only); GPO Dep.

This invention is comprised of an iron-based alloy containing chromium and optionally, nickel. The alloy has a surface barrier of silicon or silicon plus oxygen which converts at high temperature to a protective silicon compound. The alloy can be used in oxygen-sulfur mixed gases at temperatures up to about 1100°C.

8105 (PNL-SA–21635) **Calculation of transmutation in copper and comparison with measured electrical properties.** Greenwood, L.R. (Pacific Northwest Lab., Richland, WA (United States)); Garner, F.A.; Edwards, D.J. Pacific Northwest Lab., Richland, WA (United States). Aug 1993. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-9308257–1: 8. American Society for Testing and Materials symposium on reactors, Vail, VA (United States), 29 Aug - 3 sep 1993). Order Number DE95004557. Source: OSTI; INIS; NTIS; GPO Dep.

Calculations of the transmutation of pure cooper have been performed for the Fast Flux Test Facility/Materials Open Test Assembly (FFTF/MOTA) and for the STARFIRE first-wall fusion reactor. The principal transmutation products in decreasing order of importance are nickel, zinc, and cobalt. Contrary to previously published calculations, nickel and zinc are produced at nearly equal rates in FFTF, but cobalt is insignificant. The fusion reactor case shows much higher transmutation rates and produces about twice as much nickel as zinc. Transmutation rates for FFTF were determined using adjusted neutron energy spectra based on dosimetry measurements at various positions in the MOTA. The predicted transmutation rates were compared directly with nickel concentrations measured by Energy Dispersive X-Ray Spectrometry (EDS) microchemistry and with measurements of the electrical conductivity of copper and two copper alloys irradiated in the MOTA. Measurements and calculations agree within ±15%.

8106 (SAND–94-1810C) **New novel cleaning technique for extending mean time between mechanical cleans in a Genus tungsten CVD reactor.** Lujan, R.D. (Sandia National Labs., Albuquerque, NM (United States). Center for Microelectronics Technologies); Fleming, J.G.; Baird, J.L.; Gentry, M.S. Sandia National Labs., Albuquerque, NM (United States). [1994]. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. (CONF-9410269–1: Ceramics and advanced materials symposium, Albuquerque, NM (United States), 31 Oct 1994). Order Number DE95004546. Source: OSTI; NTIS; GPO Dep.

During the chemical vapor deposition of blanket tungsten from the reduction of tungsten hexafluoride (WF_6), metallic parts within the reaction chamber accumulate metallic tungsten, tungsten oxyfluorides, and other related tungsten species. The usual method for removal of the chamber deposits is to open the chamber and perform a labor intensive mechanical clean, which involves the use of hydrogen peroxide (H_2O_2) and deionized (DI) water, or an in-situ fluorine-base plasma clean. The authors have investigated the use of repetitive in-situ nitrogen trifluoride (NF_3) plasma cleans during the course of operating a Genuse 8721 tungsten chemical vapor deposition reactor. The Genuse reactor has been retrofitted with self-ratchetting linear slides, which allow the wafer clamps to be extended into the NF_3 plasma. They have extended the mean

time between failures (MTBF) due to the use of 10 minute plasma clean every 75–100 wafers. Deposition for this process is 8,000 angstroms per wafer, using 6 deposition sites. The total tungsten deposition for a 0.5 micron tungsten plug is 4 microns, per a 25 wafer lot. Instead of a total removal of the accumulated tungsten from the chamber hardware, a partial etchback of the deposition from the wafer clamps and wafer chucks was performed. With this, sources for particles and backside deposition were eliminated. They see an increase in wafer-to-wafer uniformity, lot-to-lot repeatability, and particle reduction due to the use of frequent plasma clean. Recovery time after a plasma clean is excellent and no detrimental effects from hydrogen fluoride "poisoning" were seen.

8107 (SAND–94-3047C) **Mass transport through polycrystalline microstructures.** Swiler, T.P.; Holm, E.A.; Young, M.F.; Wright, S.A. Sandia National Labs., Albuquerque, NM (United States). [1994]. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. (CONF-941144–22: 1994 fall meeting of the Materials Research Society (MRS), Boston, MA (United States), 28 Nov - 2 dec 1994). Order Number DE95004552. Source: OSTI; NTIS; GPO Dep.

Mass transport properties are important in polycrystalline materials used as protective films. Traditionally, such properties have been studied by examining model polycrystalline structures, such as a regular array of straight grain boundaries. However, these models do not account for a number of features of real grain ensembles, including the grain size distribution and variations in grain shape. In this study, a finite difference scheme is developed to study transient and steady-state mass transport through realistic two dimensional polycrystalline microstructures. Comparisons with the transport properties of traditional model microstructures provide regimes of applicability of such models. The effects of microstructural parameters such as average grain size are examined.

8108 (SAND–95-8455C) **Understanding and improving materials processing through interpreting and manipulating predictive models.** Kee, R.J.; Ting, A.; Spence, P.A. Sandia National Labs., Albuquerque, NM (United States). [1995]. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. (CONF-941144–19: 1994 fall meeting of the Materials Research Society (MRS), Boston, MA (United States), 28 Nov - 2 dec 1994). Order Number DE95004384. Source: OSTI; NTIS; GPO Dep.

Most physically based modeling software accepts input in the form of geometry definition, physical parameters, initial conditions, and boundary conditions; and then, on the basis of solving physical conservation equations, predicts the steady-state or transient behavior of a system or process. There is a growing need to create software tools that can themselves control or manipulate the physically based models in certain ways to enhance the usability of models for equipment design and process optimization. These required tools can be described broadly in the following categories: sensitivity analysis, parameter estimation, inverse problems, dynamic optimization, and real-time control. This paper discusses generally the development and application of such modeling tools, drawing examples from a specific RTP reactor design. These techniques accelerate significantly the optimal design of processes and the concurrent engineering of real-time process-control algorithms.

8109 (SP–94-65) **Crack closure - an experimental study.** Johansson, Klas. Swedish National Testing and Research Inst., Boraas (Sweden). 1994. 39p. (In Swedish). Order Number DE95737656. Source: OSTI; NTIS.

This paper investigates relations between crack growth rate and crack opening levels (as expressed with the stress intensity factor). No relations have been detected for the two different types of load history, studied in this paper. The crack opening level, expressed with the stress intensity factor, is defined as the level where the crack is fully open. This level is detected as the break-point between two straight lines in the load-displacement curve. The first load history contains an overload block in a positive pulsating load. The minimum load is zero during all these tests. During the block the maximum is increased to 125%, 150% or 175% of 15 $MPax(m)^{1/2}$. In an additional test the effects of even higher overloads were investigated. In this test the maximum load was increased to 200% of the originally load 17 $MPax(m)^{1/2}$, during the overload block. The crack growth rate behaves as the theory predicts, with noticeable acceleration and retardation. The measured stress intensity opening or closure levels do not behave as theory predicts, however. The second load history contains an underload block with the same amplitude as the overload block. The maximum load is kept constant at 15 $MPax(m)^{1/2}$ and the minimum load is decreased from zero to 25%, 50% or 75% of a compressive load of 15 $MPax(m)^{1/2}$. In the underload case no predictions for crack rate can be made for the block sequence. The measured stress intensity opening or closure levels do not behave as theory predicts. One possible explanation why the expected relations can not be observed in any of two different load histories, is an inability to accurately measure opening and closure levels with the global technique chosen. 14 refs, 34 figs, 2 tabs

8110 (SVF–522) **Corrosion testing of three highly alloyed stainless steels in hot chlorinated seawater.** Wallen, B. (Avesta Sheffield AB, Avesta (Sweden)). Stiftelsen foer Vaermeteknisk Forskning, Stockholm (Sweden). Dec 1994. 34p. (In Swedish). Order Number DE95737675. Source: OSTI; NTIS.

Three Avesta Sheffield steels, 254 SMO, 654 SMO and SAF 2507, have been tested in seawater heated to 55 degrees C. In a first test the specimens were exposed in a water which was continuously chlorinated with 2 ppm. The corrosion conditions were very severe and crevice corrosion was observed in all three steels. Pitting corrosion occurred in the welds of 254 SMO and SAF 2507 but no in 654 SMO. In a second test the continuous chlorination was preceded by a period with intermittent chlorination. During this period the passivity of the steels was improved and after subsequent exposure to continuously chlorinated water the degree of corrosion was strongly reduced. Only 654 SMO was completely resistant to crevice corrosion in flange connections and for pitting corrosion in girth welded pipes are discussed. 9 refs, 27 figs, 7 tabs

8111 (UCRL-ID–119235) **Characterization of ultradispersed aluminum.** Simpson, R.L.; Maienschein, J.L.; Swansiger, R.W.; Garcia, F.; Darling, D.H. Lawrence Livermore National Lab., CA (United States). 8 Dec 1994. 20p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. Order Number DE95006379. Source: OSTI; NTIS; GPO Dep.

Samples of ultradispersed Al were received, which were produced by electrically exploding Al wires in argon. These samples comprised very small particles that were not significantly oxidized and that were stable in air. Particle morphology were studied with SE, micropycnometry, and gas adsorption surface area. Composition were determined using various techniques, as were thermal stability and reaction exotherms. The inexplicable reports of an Al-Ar compound and of an exothermic reaction were not confirmed. The material is a stable, nonoxidized, small-particle, highly reactive form of aluminum that is of interest in energetic materials formulations.

3602 Ceramics, Cermets, and Refractories

Refer also to citation(s) 7171, 7587, 7674, 7675, 8095, 8107, 8212, 8982, 9026, 9029, 9030, 9031, 9090, 9122

8112 (ANL/ET/CP–83901) **A phenomenological model for the effect of nanocrystalline microstructure on irradiation-induced amorphization in U_3Si.** Rest, J. Argonne National Lab., IL (United States); Oak Ridge National Lab., TN (United States). Oct 1994. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38 ; AC05-84OR21400. (CONF-941144–20: 1994 fall meeting of the Materials Research Society (MRS), Boston, MA (United States), 28 Nov - 2 dec 1994). Order Number DE95004631. Source: OSTI; NTIS; INIS; GPO Dep.

A rate theory model is formulated wherein amorphous clusters are formed by a damage event. These clusters are considered centers of expansion (CEs), or excess-free-volume zones. Simultaneously, centers of compression (CCs) are created in the material. The CCs are local regions of increased density that travel through the material as an elastic (e.g., acoustic) shock wave. The CEs can be annihilated upon contact with a sufficient number of CCs, to

form either a crystallized region indistinguishable from the host material, or a region with a slight disorientation (recrystallized grain). Recrystallized grains grow by the accumulation of additional CCs. Full amorphization is calculated on the basis of achieving a fuel volume fraction consistent with the close packing of spherical entities. Amorphization of a recrystallized grain is hindered by the presence of a grain boundary. Preirradiation of U_3Si above the critical temperature for amorphization results in the formation of nanometer-size grains. In addition, subsequent reirradiation of these samples in the same ion flux at temperatures below the critical temperature shows that the material has developed a resistance to radiation-induced amorphization (i.e., a higher dose is needed to amorphous preirradiated samples than those that have not been preirradiated). In the model, it is assumed that grain boundaries act as effective defect sinks, and that enhanced defect annihilation is responsible for retarding amorphization below the critical temperature. The calculations have been validated against data from ion-irradiation experiments with U_3Si. For appropriate values of the activation energy of thermal crystallization, the model predicts the evolution of a two phase microstructure consisting of nanocrystalline grains and amorphous clusters.

8113 (ANL/ET/CP–84563) **Effects of Bi and Bi_2O_3 additions on the microstructure and superconducting properties of powder-in-tube BSCCO (2212) tapes.** Guo, J. (Univ. of Illinois, Urbana, IL (United States). Dept. of Materials Science and Engineering); Lewis, J.A.; Goretta, K.C. Argonne National Lab., IL (United States). Oct 1994. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-941013–19: Applied superconductivity conference, Boston, MA (United States), 16-21 Oct 1994). Order Number DE95004605. Source: OSTI; NTIS; INIS; GPO Dep.

The microstructural development and superconducting properties of $Bi_2Sr_2CaCu_2O_x$ (Bi-2212) Agclad powder-in-tube tapes with 2 vol% bismuth (Bi) added from either Bi (s) or Bi_2O_3 powders were investigated. Such additives reduce the peritectic decomposition temperature of pure Bi-2212 by approximately 15-20∼C. Scanning electron microscopy (SEM) and optical microscopy on polished top and cross-sections revealed that the volume fraction of Bi-free phases was lower in the Bi-added specimens relative to those based on pore Bi-2212. In addition, it appeared that the Bi-added samples had improved grain alignment, which was confirmed by x-ray diffraction analysis. Magnetic hysteresis (at 5 K between $\pm$ 5.5 T) and transport measurements (at 4.2 K) were performed on each specimen. These results showed that Bi-additions yielded superior magnetization critical currents, which is attributed to improved grain alignment and reduced secondary phases.

8114 (ANL/ET/CP–84649) **Oxygen stoichiometry and its influence on superconductivity in $Bi_2Sr_2CaCu_2O_{8+x}$.** Krishnaraj, P. (Univ. of Pittsburgh, PA (United States). Dept. of Materials Science and Engineering); Lelovic, M.; Eror, N.G.; Balachandran, U. Argonne National Lab., IL (United States). [1994]. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9407156–1: Physics and materials science of high-temperature superconductors, Porto Carras (Greece), 10-23 Jul 1994). Order Number DE95004660. Source: OSTI; NTIS; INIS; GPO Dep.

$Bi_2Sr_2CaCu_2O_{8+x}$ (2212) was synthesized from freeze-dried precursors. The oxygen content of 2212 was determined as a function of temperature and oxygen partial pressure and the variation of Tc with oxygen content was determined. It was found that 2212 without excess oxygen (x = 0) is superconducting. This points to the role of the $(Bi\text{-}O)_\infty$ layers as a source for holes in 2212. Four probe resistivity measurements were also performed on 2212. The nature of oxygen intercalation and oxygen removal in 2212 was studied by thermogravimetry and resistivity. It was also found that samples of 2212 with the same oxygen content had different T_c's depending on thermal history. This difference in $T_c$is thought to arise from oxygen occupying different sites in the lattice while maintaining the same total oxygen content.

8115 (ANL/ET/CP–84861) **Cooling rate effects on the microstructure, critical current density, and $T_c$transition of one- and two-powder BSCCO-2223 Ag-sheathed tapes.** Parrell, J.A. (Univ. of Wisconsin, Madison, WI (United States). Applied Superconductivity Center and Materials Science Program); Larbalestier, D.C.; Dorris, S.E. Argonne National Lab., IL (United States). Nov 1994. 5p. Sponsored by USDOE, Washington, DC (United States);Electric Power Research Inst., Palo Alto, CA (United States). DOE Contract W-31109-ENG-38. (CONF-941013–20: Applied superconductivity conference, Boston, MA (United States), 16-21 Oct 1994). Order Number DE95004639. Source: OSTI; NTIS; GPO Dep.

An important variable controlling the critical current density (J_c) of Ag-sheathed BSCCO-2223 tapes is the degree of phase purity of the reacted tapes. Most correlations between J_c and microstructure show that it is highly desirable to reduce the amount of non-superconducting second phases to as low a level as practical. In recent studies of the influence of cooling rate after the final reaction, we find contradictions to this general rule. The J_c (77 K, 0 T) of so-called "one-powder" tapes can be raised by as much as 50% (from ~8,000 A/cm^2 to 12,000 A/cm^2) by slow cooling in 7.5%O_2 at 0.05°C/min, even though large 2212 grains are usually seen in the slowly cooled microstructure. However, the higher J_c of the slow-cooled state does correlate with a sharper T_c transition. Experiments with "two-powder" tapes have produced similar results. These apparently anomalous results emphasize the important role played by the connectivity of the polycrystalline core in determining J_c.

8116 (ANL/ET/PP–80280) **Zone refining of sintered, microwave-derived YBCO superconductors.** Warrier, K.G.K. (CSIR, Trivandrum (India). Regional Research Lab.); Varma, H.K.; Mani, T.V.; Damodaran, A.D.; Balachandran, U. Argonne National Lab., IL (United States). Jul 1993. 16p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. Order Number DE95004657. Source: OSTI; NTIS; INIS; GPO Dep.

Post-sintering treatments such as zone melting under thermal gradient has been conducted on sintered YBCO tape cast films. YBCO precursor powder was derived through decomposition of a mixture of nitrates of cations in a microwave oven for ≈4 min. The resulting powder was characterized and made into thin sheets by tape casting and then sintered at 945 C for 5 h. The sintered tapes were subjected to repeated zone refining operations at relatively high speeds of ≈30 mm/h. A microstructure having uniformly oriented grains in the a-b plane throughout the bulk of the sample was obtained by three repeated zone refining operations. Details of precursor preparation, microwave processing and its advantages, zone refining conditions, and microstructural features are presented in this paper.

8117 (ANL/MSD/CP–84398) **Device-quality tunnel junctions on the high $T_c$superconductor $HgBa_2CuO_{4+\delta}$.** Zasadzinski, J. (Illinois Institute of Technology, Chicago, IL (United States)); Chen, J.; Romano, P.; Gray, K.E.; Wagner, J.L.; Hinks, D.G. Argonne National Lab., IL (United States). [1995]. 14p. Sponsored by USDOE, Washington, DC (United States);National Science Foundation, Washington, DC (United States). DOE Contract W-31109-ENG-38. Contract DMR 91-20000. (CONF-940926–3: 7. conference on superconductivity and applications, Buffalo, NY (United States), 7-9 Sep 1994). Order Number DE95004646. Source: OSTI; NTIS; INIS; GPO Dep.

SIN and SIS tunnel junction devices (e.g. photon detectors, logic elements) require quasiparticle characteristics that exhibit sharp current onsets at the gap voltage and very low sub-gap conductances. Progress is reported on the development of such junctions on High Tc cuprates using mechanical point contacts. In general, these contacts display the optimum characteristics that can be obtained from HTS native-surface tunnel barriers. Most cuprates display a sub-gap conductance which monotonically increases with voltage about the minimum value at zero bias. However, tunneling data of unusually high quality have been obtained for the recently discovered Hg-based cuprate, $HgBa_2CuO_4$ (T_c=96K). SIS′ tunneling data using a Nb tip are presented which exhibit very low and flat sub-gap conductances and sharp conductance peaks as expected from a BCS density of states. These results are slightly improved over earlier published results with SIN junctions. Use of the experimental data to simulate the performance of a quasiparticle mixer

demonstrates that noise temperatures approaching the quantum limit are possible for SIS and SIN mixers in the range 1-5 THz.

8118 (ANL/MSD/CP–84413) **Processing of single- and multi-domain $YBa_2Cu_3O_x$ bulk materials for levitation applications by $Nd_{1+x}Ba_{2-x}Cu_3O_y$ seeding.** Todt, V.R. (Argonne National Lab., IL (United States)); Sengupta, S.; Miller, D.J. Argonne National Lab., IL (United States). [1995]. 29p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-940926–4: 7. conference on superconductivity and applications, Buffalo, NY (United States), 7-9 Sep 1994). Order Number DE95004615. Source: OSTI; NTIS; INIS; GPO Dep.

Melt processing of $YBa_2Cu_3O_x$ (Y123) is a well established technique to produce materials for levitation applications. We report our new results on the melt-processing of Y123. To achieve materials with high levitation forces we utilize a seeding technique using $Nd_{1+x}Ba_{2-x}Cu_3O_y$ seeds (Nd123). Two different kinds of Nd13-seeds, one plate-shaped and the other cube-shaped, were developed and used for this study. The microstructures of the levitators depended strongly on the type of the seeding material used and on the seeding geometry. We were able to produce large single domains as well as materials containing five domains with three different c-axis orientations. Levitation forces up to 8.2 N for samples with a diameter of about 18 mm were found for the multi-domain samples, which is well within the area of the levitation forces measured for the single domain materials.

8119 (BNL–60429) **The real structure of columnar pinning centers in heavy-ion-irradiated cuprate superconductors.** Welch, D.O. (Brookhaven National Lab., Upton, NY (United States)); Zhu, Y.; Budhani, R.C. Brookhaven National Lab., Upton, NY (United States). [1995]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-941014–2: Topical conference on the critical state in superconductors, Honolulu, HI (United States), 24-26 Oct 1994). Order Number DE95003948. Source: OSTI; NTIS; INIS; GPO Dep.

There has been considerable recent interest in the use of columnar defects produced by irradiation with energetic heavy ions to raise the irreversibility line and improve the critical current density of cuprate superconductors. In the interpretation and theoretical modeling of the flux-pinning characteristics of heavy-ion tracks, it is generally assumed that they are simply columns of non-superconducting material. In this paper we present a more realistic description, based both on resistivity measurements and on detailed, quantitative transmission electron microscope methods (both imaging and analytical studies), of the nature of heavy-ion damage, including defects, disorder, strain fields, and oxygen deficiencies in the matrix of the superconductor surrounding the amorphous columns. The presence of such disorder appears to be a consequence of the mechanism of track formation, which involves partial epitaxial regrowth of a molten region which follows the passage of sufficiently energetic ions.

8120 (DOE/ER/45427–5) **Midwest Superconductivity Consortium: 1994 Progress report.** Purdue Univ., Lafayette, IN (United States). Jan 1995. 81p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-90ER45427. Order Number DE95005796. Source: OSTI; NTIS; INIS; GPO Dep.

The mission of the Midwest Superconductivity Consortium, MISCON, is to advance the science and understanding of high T_c superconductivity. During the past year, 27 projects produced over 123 talks and 139 publications. Group activities and interactions involved 2 MISCON group meetings (held in August and January); with the second MISCON Workshop held in August; 13 external speakers; 79 collaborations (with universities, industry, Federal laboratories, and foreign research centers); and 48 exchanges of samples and/or measurements. Research achievements this past year focused on understanding the effects of processing phenomena on structure-property interrelationships and the fundamental nature of transport properties in high-temperature superconductors.

8121 (IA–1486, pp. 54-55) **Magnetic properties of $U(Ni_{1-x}Cu_x)_2Si_2$ solid solutions in the vicinity of x = 0.5 studied by neutron diffraction and ac-susceptibility.** Kuznietz, M.; Andre, G.; Bouree, F.; Pinto, H.; Ettedgui, H.; Melamud, M. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. URANIUM ALLOYS/phase studies; URANIUM SILICIDES/phase studies; ANTIFERROMAGNETIC MATERIALS; COPPER ALLOYS; COPPER SILICIDES; INTERMETALLIC COMPOUNDS; NEUTRON DIFFRACTION; NICKEL ALLOYS; NICKEL SILICIDES; POLYCRYSTALS; SILICON ALLOYS; SILICIDES; SOLID SOLUTIONS

8122 (IA–1486, pp. 55-56) **Neutron diffraction and ac-susceptibility studies of the $U(Ni_{1-x}Cu_x)_2Si_2$ system.** Kuznietz, M.; Andre, G.; Bouree, F.; Pinto, H.; Ettedgui, H.; Melamud, M. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. URANIUM ALLOYS/phase studies; URANIUM COMPOUNDS/phase studies; ANTIFERROMAGNETIC MATERIALS; COPPER ALLOYS; COPPER COMPOUNDS; INTERMETALLIC COMPOUNDS; NEUTRON DIFFRACTION; NICKEL ALLOYS; NICKEL COMPOUNDS; POLYCRYSTALS; SILICON ALLOYS; SILICON COMPOUNDS; SOLID SOLUTIONS

8123 (INIS-RU–377, pp. 101) **Ion beam modification of hard alloy surfaces.** Poleshchenko, K.N.; Vershinin, G.A.; Povorznyuk, S.N. AN SSSR, Moscow (Russian Federation); Moskovskij Gosudarstvennyj Univ., Moscow (Russian Federation). Nauchno-Issledovatel'skij Inst. Yadernoj Fiziki. 1993. 148p. (In Russian). (CONF-9305364–: 23. International meeting on the physics of charged particle interaction with crystals, Moscow (Russian Federation), 31 May - 2 jun 1993). In *Thesies of the proceedings of the 23. International meeting on the physics of charged particle interaction with crystals.* Order Number DE94631501. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. CERMETS/ion implantation; CERMETS/wear resistance; ARGON IONS; CERMETS; DIFFUSION; ION BEAMS; MOLYBDENUM IONS; NITROGEN IONS; NUMERICAL SOLUTION; PHYSICAL RADIATION EFFECTS; TANTALUM IONS; ZIRCONIUM IONS

8124 (INIS-RU–377, pp. 102) **Electric conductivity of ion implanted boron nitride.** Kabyshev, A.V.; Lopatin, V.V. AN SSSR, Moscow (Russian Federation); Moskovskij Gosudarstvennyj Univ., Moscow (Russian Federation). Nauchno-Issledovatel'skij Inst. Yadernoj Fiziki. 1993. 148p. (In Russian). (CONF-9305364–: 23. International meeting on the physics of charged particle interaction with crystals, Moscow (Russian Federation), 31 May - 2 jun 1993). In *Thesies of the proceedings of the 23. International meeting on the physics of charged particle interaction with crystals.* Order Number DE94631501. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. 1 ref. BORON NITRIDES/electric conductivity; BORON NITRIDES/physical radiation effects; ANNEALING; CHARGE CARRIERS; ION BEAMS; ION IMPLANTATION; VACANCIES

8125 (KAERI/RR–1355/93) **Development of Hi-Tech ceramics fabrication technologies -Development of advanced nuclear materials-.** Kang, Thae Kap (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Park, Ji Youn; Kim, Sun Jae; Kim, Kyong Ho; Jung, Choong Hwan; Oh, Seok Jin. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jul 1994. 233p. (In Korean). Order Number DE95612247. Source: OSTI; NTIS; INIS.

The objective of the present work is to prepare the foundation of hi-tech ceramics fabrication technologies through developing important processes i.e., tape casting, sol-gel, single crystal growing, compacting and sintering, and grinding and machining processes. Tape casting process is essential to manufacture hard and functional thin plates and structural elements for some composite materials. For the fabrication of spherical mono-sized micropowders of oxides, sol-gel process has widely been used. Piezoelectric elements that are the core parts of the sensors of LPMS (loose part monitoring system) and ALMS (acoustic leakage monitoring system) are used in single crystal forms. Compacting and sintering processes are general methods for fabricating structural parts using powders. Grinding and machining processes are important to

achieve the final dimensions and surface properties of the parts. (Author).

8126 (KFK–5377) **Long-term safety of radioactive waste disposal: Reaction of high burnup spent fuel and UO_2 in saline brines at room temperature.** Grambow, B.; Loida, A.; Dressler, P.; Geckeis, H.; Diaz, P.; Gago, J.; Casas, I.; Pablo, J. de; Gimenez, J.; Torrero, M.E. Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Nukleare Entsorgungstechnik; Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Heisse Chemie. Aug 1994. 58p. Contract CEC F12W-0055. Order Number DE95738047. Source: OSTI; NTIS (US Sales Only); INIS.

In order to determine the long-term performance of spent fuel during direct disposal, high burnup fuel (50 MWd/kg U) has been exposed for 500 days to non-buffered saline solutions and to deionized water under static, anaerobic conditions at 25 C. In the absence of saturation effects (large solution volumes) a dissolution rate of 0,3% p.a. has been measured. Under more realistic conditions of large sample surface areas and small solution volumes, reaction rates were found to be orders of magnitude lower. The pH values remained neutral to slightly alkaline. Radiolysis did not lead to an oxidation of the solution. The releases of Sr90, Tc99, Np237 and Sb125 were controlled by the rate of dissolution of the fuel matrix, whereas the solution concentrations of U, Pu, Am and REE were governed by sorption and solubility effects. In the presence of iron, radiolytically produced oxygen has been consumed by iron corrosion and sorption on iron corrosion products effectively reduced the solution concentrations of most radionuclides. Studies of the corrosion of unirradiated UO_2 have shown strong indications for the formation of U(IV) hydroxide. Under oxidizing conditions, only in few cases solubility limits were reached. In the determination of UO_2 corrosion rates one has to distinguish between the initial fast process of dissolving an oxidized surface layer of $UO_{2.6}$ and the process of dissolution of the uranium dioxide beneath and the formation of a new layer of $UO_{2.4}$. Under anaerobic conditions reaction rates were significantly lower than under oxidizing conditions. (orig.)

8127 (LA-UR–95-440) **Solution based synthesis of perovskite-type oxide films and powders.** McHale, J.M. Jr. Los Alamos National Lab., NM (United States). Jan 1995. 210p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. Order Number DE95006170. Source: OSTI; NTIS; INIS; GPO Dep.

Dissertation submitted by James M. McHale Jr. to Temple Univ. Graduate Board, Philadelphia, PA (US).

Conventional solid state reactions are diffusion limited processes that require high temperatures and long reaction times to reach completion. In this work, several solution based methods were utilized to circumvent this diffusion limited reaction and achieve product formation at lower temperatures. The solution methods studied all have the common goal of trapping the homogeneity inherent in a solution and transferring this homogeneity to the solid state, thereby creating a solid atomic mixture of reactants. These atomic mixtures can yield solid state products through diffusionless mechanisms. The effectiveness of atomic mixtures in solid state synthesis was tested on three classes of materials, varying in complexity. A procedure was invented for obtaining the highly water soluble salt, titanyl nitrate, $TiO(NO_3)_2$, in crystalline form, which allowed the production of titanate materials by freeze drying. The freeze drying procedures yielded phase pure, nanocrystalline $BaTiO_3$ and the complete SYNROC-B phase assemblage after ten minute heat treatments at 600 C and 1,100 C, respectively. Two novel methods were developed for the solution based synthesis of $Ba_2YCu_3O_{7-x}$ and $Bi_2Sr_2Ca_2Cu_3O_{10}$. Thin and thick films of $Ba_2YCu_3O_{7-x}$ and $Bi_2Sr_2Ca_2Cu_3O_{10}$ were synthesized by an atmospheric pressure, chemical vapor deposition technique. Liquid ammonia solutions of metal nitrates were atomized with a stream of N_2O and ignited with a hydrogen/oxygen torch. The resulting flame was used to coat a substrate with superconducting material. Bulk powders of $Ba_2YCu_3O_{7-x}$ and $Bi_2Sr_2Ca_2Cu_3O_{10}$ were synthesized through a novel acetate glass method. The materials prepared were characterized by XRD, TEM, SEM, TGA, DTA, magnetic susceptibility and electrical resistivity measurements.

8128 (LUTKDH-TKOO–1015) **Zeolites - a high resolution electron microscopy study.** Alfredsson, V. Lund Univ. (Sweden). Dept. of Inorganic Chemistry 2. Oct 1994. 48p. Order Number DE95612250. Source: OSTI; NTIS; INIS.

High resolution transmission electron microscopy (HRTEM) has been used to investigate a number of zeolites (EMT, FAU, LTL, MFI and MOR) and a member of the mesoporous M41S family. The electron optical artefact, manifested as a dark spot in the projected centre of the large zeolite channels, caused by insufficient transfer of certain reflections in the objective lens has been explained. The artefact severely hinders observation of materials confined in the zeolite channels and cavities. It is shown how to circumvent the artefact problem and how to image confined materials in spite of disturbance caused by the artefact. Image processing by means of a Wiener filter has been applied for removal of the artefact. The detailed surface structure of FAU has been investigated. Comparison of experimental micrographs with images simulated using different surface models indicates that the surface can be terminated in different ways depending on synthesis methods. The dealuminated form of FAU (USY) is covered by an amorphous region. Platinum incorporated in FAU has a preponderance to aggregate in the (111) twin planes, probably due to a local difference in cage structure with more spacious cages. It is shown that platinum is intra-zeolitic as opposed to being located on the external surface of the zeolite crystal. This could be deduced from tomography of ultra-thin sections among observations. HRTEM studies of the mesoporous MCM-41 show that the pores have a hexagonal shape and also supports the mechanistic model proposed which involves a cooperative formation of a mesophase including the silicate species as well as the surfactant. 66 refs, 24 figs.

8129 **Method of fabricating silicon carbide coatings on graphite surfaces.** Varacalle, D.J. Jr.; Herman, H.; Burchell, T.D. 1992. Filed date 10 Dec 1992. U.S. Patent Application 7-988,598. 18p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC07-76ID01570. Order Number DE95006117. Source: OSTI; NTIS (US Sales Only); GPO Dep.

The vacuum plasma spray process produces well-bonded, dense, stress-free coatings for a variety of materials on a wide range of substrates. The process is used in many industries to provide for the excellent wear, corrosion resistance, and high temperature behavior of the fabricated coatings. In this application, silicon metal is deposited on graphite. This invention discloses the optimum processing parameters for as-sprayed coating qualities. The method also discloses the effect of thermal cycling on silicon samples in an inert helium atmosphere at about 1600°C which transforms the coating to silicon carbide.

8130 (SAND–94-2056C) **Feasibility of ceramic joining with high energy electron beams.** Turman, B.N. (Sandia National Labs., Albuquerque, NM (United States)); Glass, S.J.; Halbleib, J.A.; Helmich, D.R.; Loehman, R.E.; Clifford, J.R. Sandia National Labs., Albuquerque, NM (United States). [1995]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. (CONF-950129–1: 19. annual conference on advanced ceramics, materials and structures, Cocoa Beach, FL (United States), 9-12 Jan 1995). Order Number DE95004519. Source: OSTI; NTIS; INIS; GPO Dep.

Joining structural ceramics is possible using high melting point metals such as Mo and Pt that are heated with a high energy electron beam, with the potential for producing joints with high temperature capability. A 10 MeV electron beam can penetrate through 1 cm of ceramic, offering the possibility of buried interface joining. Because of transient heating and the lower heat capacity of the metal relative to the ceramic, a pulsed high power beam has the potential for melting the metal without decomposing or melting the adjacent ceramic. The authors have demonstrated the feasibility of the process with a series of 10 MeV, 1 kW electron beam experiments. Shear strengths up to 28 NTa have been measured for Si_3N_4-Mo-Si_3N_4. These modest strengths are due to beam non-uniformity and the limited area of bonding. The bonding mechanism appears to be a thin silicide reaction layer. Si_3N_4-Si_3N_4 joints with no metal layer were also produced, apparently bonded an yttrium apatite grain boundary phase.

8131 (SAND–94-2617C) **Reduction in fiber damage thresholds due to static fatigue.** Setchell, R.E. Sandia National Labs., Albuquerque, NM (United States). [1995]. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. (CONF-9410155–1: 26. annual symposium on optical materials for high power lasers: Boulder damage symposium, Boulder, CO (United States), 24-26 Oct 1994). Order Number DE95004778. Source: OSTI; NTIS; GPO Dep.

Damage mechanisms may occur during the transmission of Q-switched, Nd/YAG laser pulses through fused silica fibers. Fiber end-face characteristics, laser characteristics, and aspects of the laser-to-fiber injection typically determine dominant damage mechanisms. However, an additional damage process has been observed at internal sites where fibers were experiencing significant local stresses due to fixturing or bends in the fiber path. A transmission reduction prior to damage was typically not measurable at these sites. Damage would not always occur during initial testing, but sometimes occurred later in time at laser levels that previously had been transmitted without damage. In these cases the time at stress appeared to be more important than the number of transmitted shots prior to damage. A possible relation between internal damage thresholds at stressed sites and the total time under stress is suggested by the fact that silica fibers experience static fatigue processes. These processes involve the slow growth of local defects under tensile stress at rates that depend upon environmental conditions. Defects reaching sufficient size and having appropriate location could be sites for reduced laser-induced damage thresholds. The present work looks into the possibility that static fatigue processes can affect damage thresholds. The experiments used a laser injection and fiber routing configuration that produced significantly elevated fluences within fiber core regions under tensile stress. In order to establish initial strength and fatigue properties for these fibers, a number of samples were used to generate time-to-failure data at various stress levels. Other fiber samples were subjected to conditions that greatly accelerated fatigue processes. Internal damage thresholds were then measured in these fibers and compared to thresholds measured in fresh fibers. Conclusive comparisons were frustrated by sample-to-sample and lot-to-lot variations in fiber defects.

8132 (UM-P–93/93) **Ion implantation and thermal stress resistance of ceramics.** Gurarie, V.N. (Melbourne Univ., Parkville, VIC (Australia). School of Physics); Wiliams, J.S.; Watt, A.J. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 15p. Order Number DE95615349. Source: OSTI; NTIS (US Sales Only); INIS.

Monocrystals of sapphire and magnesia together with glass samples have been subjected to ion implantation prior to thermal shock testing in a plasma of continuously varied intensity. Measurements of the gap between adjacent fragments have been used to estimate the surface temperature. Fracture and deformation characteristics of the surface layer are measured in ion implanted and unimplanted samples using optical and scanning electron microscopy. Ion implantation is shown to modify the near-surface structure of ceramic samples by introducing damage, which makes crack initiation easier under thermal stresses in sapphire and magnesia crystals. The fracture threshold and maximum crack density are shifted towards the lower temperature range. Ion implanted MgO crystals show a ten fold increase in surface crack density. An increased crack density results in a decreased degree of damage characterised by the depth of crack penetration. The thermal stress resistance parameter of glass samples is increased at relatively small doses and decreased at higher doses. The results suggest that crack density and the degree of fracture damage in brittle ceramics operating under thermal shock conditions can be effectively controlled by ion implantation which provides crack initiating defects in the near-surface region. 22 refs., 8 figs.

8133 (UM-P–93/98) **Crystallization of sol-gel derived lead zirconate titanate thin films in argon and oxygen atmospheres.** Bursill, L.A. (Melbourne Univ., Parkville, VIC (Australia). School of Physics); Brooks, K.G. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 27p. Order Number DE95615230. Source: OSTI; NTIS (US Sales Only); INIS.

Electron diffraction and high-resolution electron microscopic techniques are applied to reveal the mechanisms of crystallization of 75 nm thin films of ferroelectric lead-zirconate-titanate (PZT). Sol-gel methods, followed by pyrolysis at 350 deg C, were used to provide a common starting point after which a variety of rapid-thermal annealing (RTA) experiments in the temperature range 400-700 deg C were made in argon, oxygen and nitrogen/hydrogen atmospheres. The results are interpreted in terms of the crystal chemical analysis, which points out that partial pressure of oxygen and heating rate are important experimental parameters which must be controlled if ferroelectric perovskite-type Pb_2ZrTiO_6, rather than pyrochlore-type Pb_2ZrTiO_{6+x}, where $O < X < 1$ or $-1 < X < O$, is to be obtained after the RTA step. Thus significant improvements in the crystallization of perovskite-type PZT were clearly demonstrated by using argon atmospheres for the RTA step. The results have significance for the production of high-quality ferroelectric thin films, with improved switching and fatigue characteristics, since even small amounts of the pyrochlore phase prove detrimental for these properties. 18 refs., 1 tab., 10 figs.

8134 (UM-P–94/27) **Synthesis of carbo-nitride films using high-energy shock plasma deposition.** Gurarie, V.N.; Orlov, A.V.; Nugent, K.W.; Weiser, P.; Prawer, S. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 6p. Order Number DE95615231. Source: OSTI; NTIS (US Sales Only); INIS.

Recent investigations shows that an enhanced nitrogen content of carbo-nitride films improves wear resistance, hardness, tribological and other properties of these films. The present work reports on the properties of nitrogen rich carbon films produced by an intense gas discharge between carbon electrodes in a nitrogen atmosphere. The energy of the discharge, initial nitrogen pressure, number of discharges and geometry are varied to establish their effect on the nitrogen content and the mechanical, structural and morphological characteristics of the deposited carbon-nitride films. The structural diagnostics include optical and scanning electron microscopy, as well as Auger and Raman Spectroscopes and Rutherford Backscattering. The C-N films formed fell into two categories, differing in morphology and mechanical properties. Type I are C-N films, containing up to 35 at. % nitrogen, and which have an amorphous structure. These films are formed at relatively low plasma shock pressure and exhibit relatively low microhardness, ≈ 2 GPa. In a relatively narrow range of the plasma shock pressure and temperature the second type of C-N deposition is observed consisting of high density, closely-packed crystal-like grains growing perpendicular to the substrate surface and displaying a cauliflower-like morphology. The microhardness of these films reaches 15 GPa, as measured by the Vickers method. 14 refs., 7 figs.

8135 (UM-P–94/39) **Orientation of rapid thermally annealed lead zirconate titanate thin films on (111) Pt substrate.** Brooks, K.G. (Ecole Polytechnique Federale, Lausanne (Switzerland)); Reaney, I.M.; Klissurska, R.; Huang, Y.; Bursill, L.A.; Setter, N. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 45p. Order Number DE95615232. Source: OSTI; NTIS (US Sales Only); INIS.

The nucleation, growth and orientation of lead zirconate titanate thin films prepared from organometallic precursor solutions by spin coating on (111) oriented platinum substrates and crystallized by rapid thermal annealing was investigated. The effects of pyrolysis temperature, post-pyrolysis thermal treatments, excess lead addition, and Nb dopant substitution are reported. The use of post pyrolysis oxygen anneals at temperatures in the regime of 350-450 deg C was found to strongly effect the kinetics of subsequent amorphous-pyrochlore perovskite crystallization by rapid thermal annealing. It has also allowed films of reproducible microstructure and textures (both (100) and (111)) to be prepared by rapid thermal annealing. It is suggested that such anneals and pyrolysis temperature affect the oxygen concentration/average Pb valence in the amorphous films prior to annealing. The changes in Pb valence state then affect the stability of the transient pyrochlore phase and thus the kinetics of perovskite crystallization. Nb dopant was also found to influence the crystallization kinetics. 28 refs., 18 figs.

3606 Other Materials

Refer also to citation(s) 7256, 7341, 7594, 7638, 7920, 7973, 8107, 8120, 8172, 8265, 8392, 8989, 9008, 9014, 9015, 9108

8136 (ANL/MSD/CP–83568) **NMR study of nanophase Al/Al-oxide powder and consolidated composites.** Suits, B.H. (Michigan Technological Univ., Houghton, MI (United States). Dept. of Physics); Apte, P.; Wilken, D.E.; Siegel, R.W. Argonne National Lab., IL (United States). Oct 1994. 5p. Sponsored by USDOE, Washington, DC (United States);National Science Foundation, Washington, DC (United States). DOE Contract W-31109-ENG-38. Grant DMR-9308168. (CONF-941039–2: 2. international conference on nanostructured materials, Stuttgart (Germany), 3-7 Oct 1994). Order Number DE95004655. Source: OSTI; NTIS; INIS; GPO Dep.

^{27}Al Nuclear Magnetic Resonance (NMR) measurements from aluminum powders and consolidated nanophase aluminum made from those powders are presented. The signals from the metal and surface oxidation are easily separated and are compared before and after consolidation. The results presented indicate that the oxide coating becomes the interface region within the nanophase composite material and that during consolidation the metal has undergone a deformation equivalent to that seen for bulk material under a compressive strain of between 4% and 8%.

8137 (DOE/CE/15613–T3) **Wear resistant composite structure of vitreous carbon containing convoluted fibers.** Burton, R.G. Burton Technologies, Inc., Raleigh, NC (United States). 1 Feb 1995. 33p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG01-94CE15613. Order Number DE95006255. Source: OSTI; NTIS; GPO Dep.

Very good friction and wear measurements are reported for MRCC (metal reinforced carbon composites), made from low-wear non-graphitic carbon matrix with metal-fiber reinforcement. Counterfaces include austenitic and martensitic stainless steels, Si nitride, and alumina. Effects of high load, high temperature, and gaseous environments are reported: removal of humidity, atm. oxygen have little effect on friction, wear for MRCC sliding against ceramic or stainless steel. Wear of Al oxide riders on MRCC is very low, not affected by contact load. 260 C temperatures do not degrade performance of 440-C riders on MRCC disks or raise friction. In small or large sizes, MRCC is made in a single-pass process for about the same volume cost as cast iron. It can survive heating in nitrogen above 1600 C without loss of integrity or major change of dimensions.

8138 (DOE/ER/45237–T3) **Design of supramolecular ordered systems for mesoscopic colloids and molecular composites. Progress report, November 10, 1993–June 10, 1994.** State Univ. of New York, Stony Brook, NY (United States). Research Foundation. [1995]. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-86ER45237. Order Number DE95004448. Source: OSTI; NTIS; INIS; GPO Dep.

During this reporting period, the authors group has been active in five areas of research: (1) improvements on their x-ray instrumentation at the SUNY Beamline, National Synchrotron Light Source (NSLS) so that they can perform new experiments which are not accessible otherwise; (2) characterization of functionalized hairy rod polymers designed for studying the macromolecular structures in molecular composites; (3) investigation of supramolecular ordered systems composed mainly of block copolymers from dilute to concentrated solutions, including the gel state; (4) evolution of crystalline structures in polymer blends and melts; and (5) multiphase structure of segment polyurethanes.

8139 (DOE/ID/12779–3) **Development of novel active transport membrande devices.** Laciak, D.V. Air Products and Chemicals, Inc., Allentown, PA (United States). Nov 1994. 98p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FC36-89ID12779. Order Number DE95002658. Source: OSTI; NTIS; GPO Dep.

Air Products has undertaken a research program to fabricate and evaluate gas separation membranes based upon promising "active-transport" (AT) materials recently developed in our laboratories. Active Transport materials are ionic polymers and molten salts which undergo reversible interaction or reaction with ammonia and carbon dioxide. The materials are useful for separating these gases from mixtures with hydrogen. Moreover, AT membranes have the unique property of possessing high permeability towards ammnonia and carbon dioxide but low permeability towards hydrogen and can thus be used to permeate these components from a gas stream while retaining hydrogen at high pressure.

8140 (DOE/PC/93225–4) **High performance materials in coal conversion utilization. Technical progress report, July 1–September 30, 1994.** Tennessee Univ., Tullahoma, TN (United States). Space Inst. Oct 1994. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-93PC93225. Order Number DE95005199. Source: OSTI; NTIS; GPO Dep.

The object of this grant is to test, analyze, and improve the elevated temperature and coal-slag corrosion resistance of a SiC_p/Al_2O_3 ceramic composite tubular material. The material will be evaluated for its ability to withstand the high pressures and elevated temperature corrosion attack encountered in a coal-fired high-temperature, high pressure air heater. The evaluation will include strength testing at elevated temperatures. In addition, the feasibility of several joining and coating techniques for enhancing the performance of ceramic tubes will also be investigated. Preliminary results are presented for some of the materials characterization tests.

8141 (DOE/R5/51901–T4) **Float zone silicon sheet growth. Quarterly technical progress report No. 5, October 1, 1994–December 31, 1994.** Bleil, C.E. Energy Materials Research, Rochester Hills, MI (United States). [1995]. 3p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG45-93R551901. Order Number DE95005119. Source: OSTI; NTIS; GPO Dep.

During this quarter, equipment for the production of silicon sheets was tested and assembled. Specifically, tasks 4,7, and 8 from the initial proposal were addressed.

8142 (KFK–5371) **Strength and elastic properties of some graphites, carbon/carbon and SiC/SiC composite materials.** Zimmermann, H. Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Materialforschung; Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Kernfusion. Aug 1994. 21p. (In German). Order Number DE95738118. Source: OSTI; NTIS (US Sales Only).

The ultimate bending strengths and the Young's moduli of some graphites, carbon/carbon and SiC/SiC composites have been measured. For most of the composite materials also the shear strength was determined. The material most thoroughly investigated in three directions was Sepcarb N112, a three dimensional CC composite. For the composite materials investigated the bending strength decreases with increasing number of the directions of reinforcement whereas the shear strength increases. (orig.)

8143 (ORNL/Sub–87-SA946C/04) **Investigation of properties and performance of ceramic composite components. Final report on Phase 2.** Curtin, W.A. (Virginia Polytechnic Inst. and State Univ., Blacksburg, VA (United States)); Reifsnider, K.L.; Oleksuk, L.L.S.; Stinchcomb, W.W. Oak Ridge National Lab., TN (United States); Virginia Polytechnic Inst. and State Univ., Blacksburg, VA (United States). 31 Oct 1994. 40p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Subcontract 19X-SA946C. Order Number DE95004737. Source: OSTI; NTIS; GPO Dep.

The purpose of Phase 2 of the Investigation of Properties and Performance of Ceramic Composite Components has been to build on and extend the work completed during Phase 1 to further advance the transition from properties of ceramic composite materials to performance of ceramic composite components used in fossil energy environments. The specific tasks of Phase 2 were: (1) develop and validate reliable and accurate high temperature, biaxial mechanical tests methods for structural ceramic composite components; (2) test and evaluate ceramic composite components, specifically tubes; (3) characterize long-term, mechanical performance of ceramic composite tubes at high temperatures; (4) develop a fundamental understanding of the mechanical degradation and performance limitations of ceramic composite components

under service conditions; (5) develop predictive models for damage tolerance and reliability; and (6) relate component performance to microstructure and, thereby, provide feedback to the associated process-development effort, to improve performance. Accomplishments for each task are given.

8144 (PNL-SA–25425) **Temperature and dose dependence of metal colloid production in alpha-irradiated CaF_2.** Weber, W.J.; Exarhos, G.J.; Wang, L.M. Pacific Northwest Lab., Richland, WA (United States). Nov 1994. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-941144–26: 1994 fall meeting of the Materials Research Society (MRS), Boston, MA (United States), 28 Nov - 2 dec 1994). Order Number DE95004907. Source: OSTI; NTIS; INIS; GPO Dep.

Single crystals of CaF_2 were irradiated with 5.8 MeV alpha particles from a ^{244}Cm source. The absorbance spectra were recorded as a function of dose and temperature. At low doses, the absorbance from the colloid band increased with dose to saturation values that changed with temperature. The colloid band exhibited a sharp increase in rate of growth over a narrow temperature range with a peak at 150°C. The intensity of the colloid band after a dose of 1.4 x 1016 a/cm^2 is a factor of 7 to 8 higher than the intensity at 100 and 200°C. The temperature (150°C) for the maximum rate of colloid growth in CaF_2 under the alpha irradiation conditions ($\sim 5 \times 10^8$ rad/h) of this study is significantly higher than the peak temperature (60°C) reported for colloid production in CaF_2 under electron irradiation at slightly higher dose rates ($\sim 10^9$ rad/h). Cryogenic transmission electron microscopy of the irradiated crystals revealed dislocation loops and small dark clusters as the dominant microstructural features.

8145 (SAND–94-1653C) **Non-destructive characterization of porous silicon using X-ray reflectivity.** Chason, E.; Guilinger, T.R.; Kelly, M.J.; Headley, T.J.; Howard, A.J. Sandia National Labs., Albuquerque, NM (United States). [1995]. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. (CONF-941144–24: 1994 fall meeting of the Materials Research Society (MRS), Boston, MA (United States), 28 Nov - 2 dec 1994). Order Number DE95004766. Source: OSTI; NTIS; GPO Dep.

Understanding the evolution of porous silicon (PS) layers at the early stages of growth is important for determining the mechanism of PS film growth and controlling the film properties. We have used X-ray reflectivity (XRR) to determine the evolution of layer thickness and interfacial roughness during the growth of thin PS layers (< 200 mn) prepared by electrochemical anodization. The porous layer grows at a constant rate for films as thin as 15 mn indicating a very short incubation period during which the surface may be electropolished before the PS structure begins to form. Interface roughness measurements indicate that the top surface of the film remains relatively smooth during growth while the roughness of the PS/silicon interface increases only slightly with film thickness. The XRR results are compared with results obtained from the same films by cross-sectional transmission electron microscopy (XTEM), atomic force microscopy (AFM) and gravimetry.

8146 (SAND–94-1692C) **High surface area, high permeability carbon monoliths.** Lagasse, R.R. (Sandia National Labs., Albuquerque, NM (United States). Organic Materials Processing Dept.); Schroeder, J.L. Sandia National Labs., Albuquerque, NM (United States). [1994]. 7p. Sponsored by USDOE, Washington, DC (United States);Gas Research Inst., Chicago, IL (United States). DOE Contract AC04-94AL85000. Contract 5091-260-2228. (CONF-941144–23: 1994 fall meeting of the Materials Research Society (MRS), Boston, MA (United States), 28 Nov - 2 dec 1994). Order Number DE95004555. Source: OSTI; NTIS; GPO Dep.

The goal of this work is to prepare carbon monoliths having precisely tailored pore size distribution. Prior studies have demonstrated that poly(acrylonitrile) can be processed into a precursor having tailored macropore structure. Since the macropores were preserved during pyrolysis, this synthetic process provided a route to porous carbon having macropores with size =0.1 to 10μm. No micropores of size <2 nm could be detected in the carbon, however, by nitrogen adsorption. In the present work, the authors have processed a different polymer, poly(vinylidene chloride) into a macroporous precursor, Pyrolysis produced carbon monoliths having macropores derived from the polymer precursor as well as extensive microporosity produced during the pyrolysis of the polymer. One of these carbons had BET surface area of 1,050 m^2/g and about 1.2 cc/g total pore volume, with about 1/3 of the total pore volume in micropores and the remainder in 1μm macropores. No mesopores in the intermediate size range could be detected by nitrogen adsorption. Carbon materials having high surface area as well as micron size pores have potential applications as electrodes for double layer supercapacitors containing liquid electrolyte, or as efficient media for performing chemical separations.

8147 (SAND–94-1703C) **Effect of He pressure on the superconducting transition temperatures of Na_2CsC_{60} and $(NH_3)_4Na_2CsC_{60}$.** Schirber, J.E. (Sandia National Labs., Albuquerque, NM (United States)); Bayless, W.R.; Rosseinsky, M.J.; Zhou, O.; Fleming, R.M.; Murphy, D.; Fischer, J.E. Sandia National Labs., Albuquerque, NM (United States). [1994]. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. (CONF-941144–33: 1994 fall meeting of the Materials Research Society (MRS), Boston, MA (United States), 28 Nov - 2 dec 1994). Order Number DE95006320. Source: OSTI; NTIS; INIS; GPO Dep.

The Na based mixed alkali doped C_{60} superconductors show anomalous behavior with respect to the "universal" superconducting transition temperature $T_c$vs lattice constant a_0 relation followed by most of the fcc A_3C_{60} superconductors. We have measured dt_c/dP for Na_2CsC_{60} and $(NH_3)_4Na_2CsC_{60}$ using solid He as the pressure medium to $\sim$ 6 kbar finding dT_c/dP equal to $-0.8\pm(0.01)$ K/kbar and $-1.0(\pm0.1)$K/kbar for Na_2CsC_{60} and $Na_2(NH_3)_4C_{60}$ respectively. Our value for Na_2CsC_{60} differs markedly from that obtained by Mizuki et al of about -1.3 K/kbar. However, using N_2 or Ar, we obtain values for dT_c/dP in substantial agreement with Mizuki et al who used fluorinert to generate their pressure. This work emphasizes the need for compressibility measurements with the same pressure medium in the appropriate temperature range so that meaningful comparisons can be made between various pressure measurements and models which are based on lattic spacing.

8148 (SAND–94-2831C) **Microporous polyimide films for reduced dielectric applications.** Saunders, R.S.; Aubert, J.H.; McNamara, W.F. Sandia National Labs., Albuquerque, NM (United States). [1995]. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. (CONF-941142–27: American Society of Mechanical Engineers' winter annual meeting, Chicago, IL (United States), 9-11 Nov 1994). Order Number DE95004543. Source: OSTI; NTIS; GPO Dep.

With all the advances in the microelectronics industry, a limiting factor to computer chip speed and size is becoming the dielectric constant of the interlayer insulating materials. Dielectric constants of these layers have been reduced in going from inorganic to organic type materials. A further reduction in dielectric constant, coupled with better mechanical properties are still required for these types of materials. The authors have developed a technique involving spincoating in conjunction with a thermodynamic process called "Non-solvent Induced Phase Separation" (NSIPS) to create microporous polyimide films that exhibit both a lower dielectric constant and better stress reduction properties compared to their solid film counterparts. In this technique, the authors spincoat a soluble polyimide solution in 1,3-dimethoxybenzene solvent onto a silicon wafer, and then immediately submerse the "wet" polymer film into a non-solvent bath, typically toluene. Phase separation of the polymer occurs on a micron size scale and the resulting microporous structure becomes locked in by the high glass transition temperature of the polyimide. The authors have determined the factors affecting the film morphology, thickness, pore size, and percent porosity; these factors include the polymer concentration, spin speed, and the type of non-solvent used. The different morphologies obtained for the varying non-solvents are explained in terms of thermodynamics and kinetics of phase separation and diffusion, using an idealized ternary phase diagram. One particular film having a porosity of 68%, thickness of 22 microns and pore size of 1.4 microns had a measured dielectric constant of 1.88 and dielectric loss of 0.002. Stress measurements indicated that the microporous

film reduced surface stress on the wafer by more than a factor of 10 when compared to the analogous solid polyimide film.

8149 (SAND–94-2944C) **Particle transport in plasma reactors.** Rader, D.J. (Sandia National Labs., Albuquerque, NM (United States)); Geller, A.S.; Choi, Seung J.; Kushner, M.J. Sandia National Labs., Albuquerque, NM (United States). [1995]. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. (CONF-9410132–4: Microcontamination '94, San Jose, CA (United States), 5-6 Oct 1994). Order Number DE95004541. Source: OSTI; NTIS; GPO Dep.

SEMATECH and the Department of Energy have established a Contamination Free Manufacturing Research Center (CFMRC) located at Sandia National Laboratories. One of the programs underway at the CFMRC is directed towards defect reduction in semiconductor process reactors by the application of computational modeling. The goal is to use fluid, thermal, plasma, and particle transport models to identify process conditions and tool designs that reduce the deposition rate of particles on wafers. The program is directed toward defect reduction in specific manufacturing tools, although some model development is undertaken when needed. The need to produce quantifiable improvements in tool defect performance requires the close cooperation among Sandia, universities, SEMATECH, SEMATECH member companies, and equipment manufacturers. Currently, both plasma (e.g., etch, PECVD) and nonplasma tools (e.g., LPCVD, rinse tanks) are being worked on under this program. In this paper the authors summarize their recent efforts to reduce particle deposition on wafers during plasma-based semiconductor manufacturing.

8150 (SLAC–450) **A photoemission study of the diamond and the single crystal C_{60}.** Wu, Jin. Stanford Linear Accelerator Center, Menlo Park, CA (United States). Mar 1994. 104p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (SLAC/SSRL–0089). Order Number DE95006149. Source: OSTI; NTIS; INIS; GPO Dep.

This report studied the elctronic structure of diamond (100) and diamond/metal interface and C_{60}, using angle-resolved and core level photoemission. The C(100)-(2X1) surface electronic structure was studied using both core level and angle resolved valence band photoemission spectroscopy. The surface component of the C 1s core level spectrum agrees with theoretical existence of only symmetrical dimers. In the case of metal/diamond interfaces, core level and valence photoelectron spectroscopy and LEED studies WERE MADE OF B and Sb on diamond (100) and (111) surfaces. In the case of single-crystal C_{60}, photoemission spectra show sharp molecular features, indicating that the molecular orbitals are relatively undisturbed in solid C_{60}.

8151 (UM-P–92/86) **Characterization of { 11-bar 01 } twin dislocation structures in evaporated titanium thin films by HREM.** Kasukabe, Y. (Tohoku Univ., Sendai (Japan). Coll. of General Education); Yamada, Y.; Lin. Pengju; Bursill, L.A. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 16p. Sponsored by Australian Research Council, Canberra, ACT (Australia);Tohoku Univ., Sendai (Japan). Order Number DE95615391. Source: OSTI; NTIS (US Sales Only); INIS.

The structure of {11-bar 01} twin dislocations in Ti films evaporated on NaCl substrates at 250 deg C has been examined and characterised by high-resolution electron microscopy. The results have revealed that a twin dislocation structure with step height 4 x $d(K_1)$, where $d(K_1)$ is the spacing of the {11-bar 01} twin planes, actually dissociates into two {11-bar 01} twin dislocations with step heights of $d(K_1)$ and 3 x $d(K_1)$. The twin dislocation with a step height of 3 x $d(K_1)$ contains an edge dislocation in the core while that with a step height of $d(K_1)$ is a simple classical twin dislocation structure. Twin dislocations with step height of 2 x $d(K_1)$, including an edge dislocation in the core, also occur. The atomic-scale core structures of {11-bar 01} twin dislocations may be derived by analysis of the high-resolution images. The relative mobilities of the three types of twin dislocations is then discussed. 17 refs., 4 figs.

40 CHEMISTRY

4001 Analytical and Separations Chemistry

Refer also to citation(s) 7102, 7161, 7262, 7289, 7339, 7342, 7348, 7425, 7553, 7554, 7555, 7556, 7557, 8179, 8217, 8324, 8420, 9053

8152 (CNIC–00766) **Determination of micro-amount carbon in sodium metal by vacuum distillation-gas chromatography.** Wen Ximent (Academia Sinica, Beijing, BJ (China). Inst. of Atomic Energy); Guo Qingzhou; Sun Shiping. China Nuclear Information Centre, Beijing, BJ (China). Jun 1993. 10p. (In Chinese). (IAE–0121.). Order Number DE95611763. Source: OSTI; NTIS (US Sales Only); INIS.

The amount of carbon in sodium metal which is used as a coolant of fast reactors has the effect on physical and mechanical properties of construction materials for reactors. A method to determine microamounts carbon in sodium metal by vacuum distillation-gas chromatography in the ppm level has been developed. Under the argon atmosphere, 1 $\approx$ 6 g sodium samples are put into silica crucibles, then crucibles are placed in a stainless steel distillation pot at 673 K and 6.7 x 10^{-3} Pa to remove the sodium. The residue is combusted at 1373 K with pure oxygen for 30 minutes. The CO_2 formed is collected in a silica gel cold trap (193 $\approx$ 173 K) and measured by gas chromatography after disadsorption by boiling water. Many experimental conditions such as distillation, combustion, cold trap, treatment of apparatus and quantitative method have been studied. By this method the relative deviation is less than 12% with the content of carbon in sodium at the range of 5 $\approx$ 100 ppm. Standard addition experiments are carried out with nuclear grade graphite and sodium carbonate standards. Within the above range, the recoveries are (104.9 +- 11.1)% and (100.8 +-19)%, respectively. This method has met the technical requirements for carbon analysis in nuclear grade sodium.

8153 (CNIC–00793) **Study on the extraction of Am^{3+} and rare earth elements with β-oxime extractant (7804) (I).** Hou Ruiqin (Qinghua Univ., Beijing, BJ (China). Inst. of Nuclear Energy Technology); Jiao Rongzhou; Zhu Yongjun. China Nuclear Information Centre, Beijing, BJ (China). Nov 1993. 8p. (In Chinese). (TSHUNE–0071.). Order Number DE95611881. Source: OSTI; NTIS (US Sales Only); INIS.

The influences of equilibrium time, temperature, pH value, extractant concentration and feed concentration on the distribution of Am^{3+} and rare earth elements have been studied in the extraction with β-oxime extractant 7804. It was found that the optimum extraction equilibrium time is 30 min; temperature is 20 +- 1 degree C; extractant concentration is 0.2 mol/L and the pH is from 4.8 to 5.1. Under these experimental conditions, 7804 forms 2:1 complex with Am^{3+} or rare earth elements. The extractability sequence shows is Am>Eu>Sm>Nd>Pr>Ce>La.

8154 (DOE/MC/29109–3979) **Road Transportable Analytical Laboratory (RTAL) system. Quarterly progress report, August 1994–October 1994.** Department of Energy, Morgantown, WV (United States). Morgantown Energy Technology Center. 15 Dec 1994. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC21-92MC29109. Order Number DE95006208. Source: OSTI; NTIS; GPO Dep.

Goal is to develop and demonstrate a system for rapid, accurate analysis of a wide variety of hazardous and radioactive contaminants in soil, groundwater, and surface waters. More specifically, a road- transportable, fully independent laboratory system for on-site analyses is desired, for assisting DOE cleanup and remediation efforts. This report documents progress during the first quarterly period of Phase II. The RTAL system will be integrated into ECO's existing TERMM and TERMM modular systems.

8155 (IA–1486, pp. 88-89) **Enhancing XRPD pattern quality with line profile fitting in multiphase systems.** Kimmel, G.; Sariel, J.; Dahan, I.; Nathan, S.; Admon, U. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. X-RAY DIFFRACTION/spectra unfolding; CALIBRATION STANDARDS; DEBYE-SCHERRER METHOD; NUMERICAL SOLUTION; SHAPE; STRUCTURAL CHEMICAL ANALYSIS; X-RAY DIFFRACTOMETERS

8156 (INIS-mf–13801, pp. NAT3) **PIXE analysis setup using a proton in air beam facility at the ININ.** Fernandez, M. (Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico)); Policroniades, R.; Jimenez, F.; Murillo, G.; Moreno, E. Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico); Instituto de Investigaciones Electricas, Cuernavaca (Mexico); Universidad Autonoma del Estado de Morelos (UAEM), Cuernavaca (Mexico). 1992. 30p. (CONF-9208272–: 9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry, Cuernavaca (Mexico), 16-21 Aug 1992). In *9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry. Abstracts.* Order Number DE95611878. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. FOILS/li-drifted si detectors; PIXE ANALYSIS/proton beams; ACCELERATOR FACILITIES; ELECTRONIC EQUIPMENT; FOILS; MULTI-ELEMENT ANALYSIS; PULSE TECHNIQUES; SAMPLING; VACUUM SYSTEMS

8157 (INIS-mf–13801, pp. NAT5) **Emission Moessbauer spectroscopic studies on mixed valence states of Fe-57 atoms produced in Co-57 labelled trinuclear cobalt-iron carboxylates.** Sano, H. (Tokyo Metropolitan Univ. (Japan). Faculty of Science); Sato, T.; Ishishita, K.; Nakada, M.; Katada, M.; Endo, K. Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico); Instituto de Investigaciones Electricas, Cuernavaca (Mexico); Universidad Autonoma del Estado de Morelos (UAEM), Cuernavaca (Mexico). 1992. 30p. (CONF-9208272–: 9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry, Cuernavaca (Mexico), 16-21 Aug 1992). In *9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry. Abstracts.* Order Number DE95611878. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. EMISSION SPECTRA/temperature dependence; MOESSBAUER EFFECT/valence; COBALT COMPLEXES; COBALT 57; ELECTRON CAPTURE DECAY; HALOGENS; IRON COMPLEXES; IRON 57; VALENCE

8158 (INIS-mf–13801, pp. NAT8) **Determining uranium enrichment by gamma spectrometry.** Korob, R.O. (Comision Nacional de Energia Atomica, Buenos Aires (Argentina)); Otero, D. Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico); Instituto de Investigaciones Electricas, Cuernavaca (Mexico); Universidad Autonoma del Estado de Morelos (UAEM), Cuernavaca (Mexico). 1992. 30p. (CONF-9208272–: 9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry, Cuernavaca (Mexico), 16-21 Aug 1992). In *9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry. Abstracts.* Order Number DE95611878. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. GAMMA SPECTROSCOPY/isotope separation; POWDERS; PROTACTINIUM 234; RADIOACTIVITY; SAMPLING; STATISTICS; URANIUM OXIDES; URANIUM 235; URANIUM 238

8159 (INIS-mf–13801, pp. NAT11) **Spectrophotometric method for the determination of Thorium in urine using anionic resin and arsenazo (III).** Rodriguez-Gonzalez, E. (Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico)); Garcia-Flores, M. Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico); Instituto de Investigaciones Electricas, Cuernavaca (Mexico); Universidad Autonoma del Estado de Morelos (UAEM), Cuernavaca (Mexico). 1992. 30p. (CONF-9208272–: 9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry, Cuernavaca (Mexico), 16-21 Aug 1992). In *9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry. Abstracts.* Order Number DE95611878. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. CHEMICAL ANALYSIS/urine; SPECTROPHOTOMETRY/thorium; ARSENAZO; CALCIUM NITRATES; URINE; COPRECIPITATION; NITRIC ACID; RESINS; SAMPLING; SPECTROPHOTOMETRY; THORIUM

8160 (INIS-mf–13801, pp. NAT12) **^{10}Be and ^{26}Al production cross sections with 12 GeV protons measured by accelerator mass spectrometry.** Shibata, S. (Tokyo Univ., Tanashi (Japan). Inst. for Nuclear Study); Imamura, M.; Nagai, H.; Kobayashi, K.; Sakamoto, K.; Furukawa, M.; Fujiwara, I. Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico); Instituto de Investigaciones Electricas, Cuernavaca (Mexico); Universidad Autonoma del Estado de Morelos (UAEM), Cuernavaca (Mexico). 1992. 30p. (CONF-9208272–: 9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry, Cuernavaca (Mexico), 16-21 Aug 1992). In *9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry. Abstracts.* Order Number DE95611878. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. ALUMINIUM 26/cross sections; BERYLLIUM 10/cross sections; ACCELERATORS; FOSSILS; HIGH ENERGY PHYSICS; SPALLATION; SPECTROSCOPY; SYNCHROTRONS; TARGETS

8161 (INIS-mf–13801, pp. NAT13) **Analysis of Pre colombian Mexican golden pieces by X-ray fluorescence spectrometry.** Avila-Perez, P. (Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico)); Zarazua-Ortega, G. Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico); Instituto de Investigaciones Electricas, Cuernavaca (Mexico); Universidad Autonoma del Estado de Morelos (UAEM), Cuernavaca (Mexico). 1992. 30p. (CONF-9208272–: 9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry, Cuernavaca (Mexico), 16-21 Aug 1992). In *9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry. Abstracts.* Order Number DE95611878. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. FLUORESCENCE SPECTROSCOPY/cultural objects; MEXICO/research programs; ALLOYS; COMPUTER CALCULATIONS; HGI2 SEMICONDUCTOR DETECTORS; IAEA; MEXICO; SPECTRA; STANDARDIZATION

8162 (INIS-mf–13801, pp. NAT14) **Determination of U-235 enrichment on uranium materials by gamma spectrometry.** Martinez-Lugo, R. (Comision Nacional de Seguridad Nuclear y Salvaguardias, Mexico City (Mexico)); Lopez-Reyes, C. Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico); Instituto de Investigaciones Electricas, Cuernavaca (Mexico); Universidad Autonoma del Estado de Morelos (UAEM), Cuernavaca (Mexico). 1992. 30p. (CONF-9208272–: 9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry, Cuernavaca (Mexico), 16-21 Aug 1992). In *9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry. Abstracts.* Order Number DE95611878. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. URANIUM 235/gamma spectroscopy; CALIBRATION; COMPUTER CALCULATIONS; ELECTRONIC EQUIPMENT; HIGH-PURITY GE DETECTORS; ISOTOPE SEPARATION; RELIABILITY; SAMPLING; SHIELDING

8163 (INIS-mf–13801, pp. NAT16) **Comparison of radiochemical and spectrophotometric detection methods for HPLC-separated Cr(III) hydrolytic species.** Carvalhinho, C.C.L. (Universidade Estadual de Campinas, SP (Brazil). Inst. de Quimica); Costa, M.F.C.; Bonato, P.S.; Collins, C.H.; Collins, K.E. Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico); Instituto de Investigaciones Electricas, Cuernavaca (Mexico); Universidad Autonoma del Estado de Morelos (UAEM), Cuernavaca (Mexico). 1992. 30p. (CONF-9208272–: 9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry, Cuernavaca (Mexico), 16-21 Aug 1992). In *9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry. Abstracts.* Order Number DE95611878. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. CHROMIUM/spectrophotometry; AQUEOUS SOLUTIONS; CHROMATOGRAPHY; CHROMIUM; SPECTROPHOTOMETRY; CHROMIUM 51; DERIVATIZATION; HYDROLYSIS; ION EXCHANGE MATERIALS; POLYMERS

8164 (INIS-mf–14440, pp. 7) **Physics and archaeology an application of nuclear analytical technique.** Lamehi-Rashti, M. Iranian Physics Society, Teheran (Iran, Islamic Republic of); Atomic Energy Organization of Iran, Teheran (Iran, Islamic Republic of). Nuclear Research Centre. Aug 1994. 91p. (In English, Persian). (CONF-9408203–: Annual physics conference of Iran, Sanandaj

(Iran, Islamic Republic of), 19 Aug - 1 sep 1994). In *Abstracts of annual physics conference of Iran, 1373 Kordestan University.* Order Number DE95611717. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. X-RAY FLUORESCENCE ANALYSIS/archaeology; USES; ARCHAEOLOGY

8165 (INIS-mf–14450) **Ion exchange of Cobalt and Cadmium in Zeolite X.** Nava M, I. Universidad Autonoma del Estado de Mexico, Toluca (Mexico). Facultad de Quimica. 1994. 66p. (In Spanish). Order Number DE95614585. Source: OSTI; NTIS (US Sales Only); INIS.

The growing development in the industry has an important contribution to the environmental damage, where the natural effluents are each day more contaminated by toxic elements, such as: mercury, chromium, lead and cadmium. So as to separate such elements it has sorbent must have enough stability, and have a sharp capacity of sorption. In this work it was studied the sorption behavior of cobalt and on the other hand, cadmium in aqueous solutions, which along with sodic form of the Zeolite X, undergoes a phenomenon of ionic interchange. Such interchange was verify to different concentration of cadmium, cobalt and hydronium ion. The content of cobalt and sodium in the interchanged samples was detected through the neutronic activation analysis. The results disclose a higher selectivity for cadmium than cobalt. (Author).

8166 (INIS-RU–377, pp. 92) **Analysis of the composition of ion-beam irradiated elastomer using the Rutherford back scattering.** Tashlykov, I.S.; Kasperovich, A.V.; Kulikauskas, V.S.; Pal'chekh, V.Ch.; Tashlykova, I.I.; Shadrukhin, M.G. AN SSSR, Moscow (Russian Federation); Moskovskij Gosudarstvennyj Univ., Moscow (Russian Federation). Nauchno-Issledovatel'skij Inst. Yadernoj Fiziki. 1993. 148p. (In Russian). (CONF-9305364–: 23. International meeting on the physics of charged particle interaction with crystals, Moscow (Russian Federation), 31 May - 2 jun 1993). In *Thesies of the proceedings of the 23. International meeting on the physics of charged particle interaction with crystals.* Order Number DE94631501. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. MOLYBDENUM/quantitative chemical analysis; OXYGEN/quantitative chemical analysis; BACKSCATTERING; ELASTOMERS; ION BEAMS; MOLYBDENUM; MOLYBDENUM IONS; OXYGEN; RUTHERFORD SCATTERING; SURFACE TREATMENTS

8167 (JINR-D–15-93-80, pp. 109-111) **Application of microtron braking gamma radiation to study heavy metal distribution in the process of coal burning.** Maslov, O.D. (Joint Inst. for Nuclear Research, Dubna (Russian Federation)); Belov, A.G. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1993. 119p. (In Russian). (CONF-9209490–: Workshop on application of microtrons in nuclear physics, Plovdiv (Bulgaria), 22-24 Sep 1992). In *Microtron MT-25. Workshop on application of microtrons in nuclear physics.* Order Number DE95611718. Source: OSTI; NTIS (US Sales Only); INIS.

The distribution of heavy metals (Cr, Zr, Nb, Mo, Sb, Ba, Pb), As and I over the technological fractions in the process of brown coal burning has been studied by the method of instrumental gamma-activation analysis (IGAA) using a microtron braking gamma radiation. It is shown that the employment of a microtron for IGAA allows up to 50 elements be determined in coal and its burning products with a detection limit of 10^{-6} to 10^{-9} g/g. 2 refs., 1 fig., 1 tab.

8168 (JINR-D–15-93-80, pp. 112-113) **Hydrogen content determination in alkali metals.** Teterev, Yu.G. (Joint Inst. for Nuclear Research, Dubna (Russian Federation)). Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1993. 119p. (In Russian). (CONF-9209490–: Workshop on application of microtrons in nuclear physics, Plovdiv (Bulgaria), 22-24 Sep 1992). In *Microtron MT-25. Workshop on application of microtrons in nuclear physics.* Order Number DE95611718. Source: OSTI; NTIS (US Sales Only); INIS.

A nuclear technique of hydrogen determination in alkali metals is described. It is based on sample irradiation with epithermal neutrons passed through a resonance filter. Neutrons scattered on nuclei of the substance under study were registered with a resonance detector. Due to an improved design of the analytical set-up and an increased statistics of measurement, detection limit of hydrogen in lithium and its alloys reached a value of 2×10^{-4} g/g. 2 refs.

8169 (KAERI/RR–1231/92) **Development of atomic spectroscopy technology.** Lee, Jong Min (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Cha, Hyung Ki; Song, Kyu Seok; Yang, Ki Ho; Baik, Dae Hyun; Lee, Young Joo; Yi, Jong Hoon; Jeong, Do Young; Jeong, Eui Chang; Yoo, Byung Duk; Cha, Byung Heon; Kim, Seong Ho; Nam,.Korea Cancer Center Hospital, Seoul (Korea, Republic of). Dec 1992. 117p. (In Korean). Order Number DE95611775. Source: OSTI; NTIS; INIS.

This project is aimed for the 'Development of extraction and separation techniques for stable isotopes by atomic laser spectroscopy technique'. The project is devided by two sub-projects. One is the 'Development of the selective photoionization technology' and the other is 'Development of ultrasensitive spectroscopic analysis technololgy'. This year studies on Hg and Yb, both of which have 7 isotopes, have been performed and, as a result, it was proved that specific isotopes of these elements could be selectively extracted. In addition study on plasma extraction technique, development of atomizers, design of electron gun have been the result of the project in 1992. In second sub-project trace determination of Pb has been performed with laser resonance ionization spectroscopy. As a result 20 picogram of detection limit has been obtained. In addition to these results, design of high sensitive laser induced fluorescence detection system as well as remote sensing DIAL system have been done. (Author).

8170 (KAERI/RR–1241/93) **A study on the treatment of industrial wastewater containing heavy metals.** Yoon, Myoung Hwan (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Jang, In Soon; Park, Jang Jin; Choi, Chang Shik; Lee, Yoon Hwan; Shin, Jin Myoung. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jun 1993. 89p. (In Korean). Order Number DE95611776. Source: OSTI; NTIS; INIS.

It is essential to treat heavy metals contained in industrial wastewater safely and economically for the protection of the environment. An effective method of separating heavy metals using acornic acid for the first time in the world must be utilized for wastewater treatment. One of the merits of this method lies in its cheap treatment cost. Furthermore, the secondary contamination, which occurs often when chemical purifiers are used, could be minimized. Another advantage of utilizing the acornic acid is that various kinds of heavy metals contained in industrial wastewater can be purified at once. The final purpose of this project is to commercialize the method by 1994. (Auther).

8171 (KAERI/RR–1264/93) **Development on the technology for tritium removal processes (II).** Sung, Ki Woung (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Kim, Yong Eak; Na, Jung Won; Jung, Yong Won; Ku, Che Hyu; Kim, Kwang Rag; Chung, Hoong Suck; Lee, Han Soo; Pack, Soong Woo; Kang, Hee Suk; Kim, You Sun; Cho, Young Hyun; Ahn, Do.Korea Cancer Center Hospital, Seoul (Korea, Republic of). Dec 1993. 114p. (In Korean). Order Number DE95611777. Source: OSTI; NTIS; INIS.

In order to decrease tritium exposure to workers, the ratio of which is up to 40% of total exposure, tritium removal facility is getting to be one of the considerable parameters in Korea, due to the next CANDUs to be operated at Wolsung NPP. For investigating the column characteristics of cryogenic distillation of H_2/D_2 system, a preliminary distillation apparatus for Ar/N_2 distillation was designed and manufactured. It consisted of a distillation column (20 mm diameter, 500 mm height), a reboiler and a condenser, surrounded with a liquid nitrogen jacket and a vacuum insulating box. Several kinds of packing materials including Dixon ring will be tested. Computer simulation showed that the reaching time for steady-state was approximately 20 minutes, while the concentration ratio between the top and the lower art was around 2000. (Author).

8172 **Tetraethyl orthosilicate-based glass composition and method.** Wicks, G.G.; Livingston, R.R.; Baylor, L.C.; Whitaker, M.J.; O'Rourke, P.E. To Dept. of Energy. 1992. Filed date 31 Dec 1992. U.S. Patent Application 7-999,338. 39p. Sponsored by

USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE95006113. Source: OSTI; NTIS (US Sales Only); GPO Dep.

Disclosed is a tetraethyl orthosilicate-based, sol-gel glass composition with idditives selected for various applications. The composition is made by mixing ethanol, water, and tetraethyl orthosilicate, adjusting the pH into the acid range, and aging the mixture at room temperature. The additives, such as an optical indicator, filler, or catalyst, is then added to the mixture to form the composition which can be applied to a substrate before curing. If the additive is an indicator, the light-absorbing characteristics of which vary upon contact with a particular analyte, the indicator can be applied to a lens, optical fiber, reagant strip, or flow cell for use in chemical analysis. Alternatively, an additive such as alumina particles is blended into the mixture to form a filler composition for patching cracks in metal, glass, or ceramic piping.

8173 (PINSTECH-HPD–142) **ICP-MS as advantageous analytical technique for the determination of long-lived ^{99}Tc in the environment.** Ihsanullah (Pakistan Inst. of Nuclear Science and Technology, Islamabad (Pakistan). Health Physics Div.). Pakistan Inst. of Nuclear Science and Technology, Islamabad (Pakistan). Health Physics Div. May 1992. 14p. Order Number DE95614628. Source: OSTI; NTIS (US Sales Only); INIS.

Technetium (Tc) was the first artificially created by man and has no stable isotope. The most crucial technetium isotope environmentally ^{99}Tc is a pure beta emitter with a half-life of 2.1 X 105 years. The main source of ^{99}Tc to the environment is the disposal of liquid wastes from nuclear installations or during separation and recovery of spent nuclear fuels. Because of its long half life, high fission yield, mobility and current interest in the collective long term doses, it is necessary to establish a knowledge of the behavior of ^{99}Tc in the environment for complete assessment of the impact of nuclear industry. Due to various analytical difficulties however, data on the behavior of Tc in the environment are limited. In the literature, many techniques are reported for the analysis of Tc. A very sensitive, precise and powerful technique is required which can be applied to environmental samples in order to gain information by obtaining more precise data to assess the impact of Tc releases on man. Attention has been focussed for this purpose on a new powerful technique i.e. inductively coupled plasma mass spectrometry (ICP-MS). This report has been directed towards the development of ICP-MS. The technique gives a very high sensitivity enabling long lived radionuclides including ^{99}Tc to be measured directly down to pg ml-1 levels in solution. Because of its versatility ICP-MS is finding applications for trace multielement analysis and low detection limits in almost all fields. (author).

8174 (PINSTECH-RIAD–138) **Standardization of $^{13}CO_2$ production procedure from organic matter for mass spectrometric analysis.** Sajjad, M.I. (Pakistan Inst. of Nuclear Science and Technology, Islamabad (Pakistan). Radiation and Isotope Application Div.); Latif, Z.; Tasneem, M.A.; Ali, M.; Bilal, R. Pakistan Inst. of Nuclear Science and Technology, Islamabad (Pakistan). Radiation and Isotope Application Div. Nov 1993. 16p. Order Number DE95614629. Source: OSTI; NTIS (US Sales Only); INIS.

This report summarizes the ways and means by which $^{13}Co_2$ production procedure from organic matter can be standardized. Optimum sample preparation conditions were determined to get reproducible results. Plant combustion for six minutes at 900-1000 degree C with pure O_2 and ten minutes for conversion of CO to CO_2 over CUO gauze at 850 degree C have been found optimum conditions. Internal standards: PINSTECH wheat straw, PINSTECH grass sample, Glucose-D glaxo PINSTECH and polyethylene foil PINSTECH were selected, and calibrated against IAEA Sucrose and polyethylene foil standards. These internal standards have been used for correction of delta 13 C results. The mechanisms for the correction of results has been described. Causes of isotope fractionation of plant samples were determined. Statistical summary of measured results for delta ^{13}C standards has also been given. (author).

8175 (SAND–94-3147C) **The effect of O_2 intercalation on the rotational dynamics and the ordering transition of C_{60}.** Myers, S.A.; Assink, R.A.; Schirber, J.E.; Loy, D.A. Sandia National Labs., Albuquerque, NM (United States). [1995]. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. (CONF-941144–27: 1994 fall meeting of the Materials Research Society (MRS), Boston, MA (United States), 28 Nov - 2 dec 1994). Order Number DE95004765. Source: OSTI; NTIS; GPO Dep.

We have used ^{13}C magic-angle spinning (MAS) nuclear magnetic resonance (NMR) to characterize the structure and rotational dynamics of C_{60} containing oxygen molecules located in the interstitial sites of the fcc lattice. Under normal conditions, a narrow peak at 143.7 ppm is observed for C_{60}. When exposed to oxygen at moderate pressures, several additional resonances appear in the ^{13}C MAS NMR spectrum. These secondary resonances are shifted downfield from the main peak at 143.7 ppm and are due to the Fermi-contact interaction of the paramagnetic oxygen molecules with the ^{13}C nuclear spins. The presence of oxygen depresses the orientational ordering transition by ca. 20 K as observed by DSC. The spin-lattice relaxation time (T_1) of each secondary peak shows a minimum near the ordering transition, indicating that this transition is not dependent on the number of oxygen molecules surrounding an individual C_{60} molecule. The T_1, due to paramagnetic relaxation, normalized by the number of surrounding oxygen molecules, is constant. This observation demonstrates that within a given sample, the dynamics of C_{60} molecules are independent of the number of surrounding oxygen molecules.

8176 (SAND–94-8251) **Recipes for high resolution time-of-flight detectors.** Anz, S.J. (Univ. of California, Los Angeles, CA (United States)); Felter, T.E.; Hess, B.V.; Daley, R.S.; Roberts, M.L.; Williams, R.S. Sandia National Labs., Albuquerque, NM (United States). Jan 1995. 60p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. Order Number DE95006196. Source: OSTI; NTIS; GPO Dep.

The authors discuss the dynamics, construction, implementation and benefits of a time-of-flight (TOF) detector with count rates an order of magnitude higher and resolution three to four times better than that obtainable with a surface barrier detector. The propose use of design criteria for a time-of-flight detector is outlined, and the determination of a TOF detector's total relative timing error and how this value determines the mass resolution are illustrated using a graphical analysis. They present simulation and experimental examples employing light ions and discuss advantages and pitfalls of medium-energy heavy ion TOF spectrometry.

8177 (SVF–523) **De-aeration of feedwater by membrane-technique.** Hellman, M.H. (Ingenjoersfirma Mats H Hellman, Haegersten, (Sweden)). Stiftelsen foer Vaermeteknisk Forskning, Stockholm (Sweden). Dec 1994. 23p. (In Swedish). Order Number DE95737676. Source: OSTI; NTIS.

District heating systems and boilers should to be fed with de-aerated water to prevent corrosion. The water can be de-aerated chemically or thermally by heating with hot water or steam. Society's increased environmental consciousness demands that industry reduce the use of chemicals. A DOR plant for de-aeration of feedwater to the district heating system has been installed for evaluation at the district heating plant in Mora. The DOR plant is build on a so-called DOR membrane concept (Dissolved Oxygen Removing) that uses a vacuum system and no chemicals. This report describes the evaluation of the DOR plant. The test show that the DOR plant can produce water with a very low oxygen content. The deciding factor for how low the oxygen content will be depends on the capacity of the vacuum pump. The temperature of the water is also very important. The lower the temperature the less the oxygen content. It was impossible to establish the lowest possible oxygen content as the vacuum pump began to cavitate at a pressure of 30-40 mbar. During the test the lowest oxygen content of 9 μg O_2/kg at 15 degrees C was achieved. However at this level the pump cavitated seriously. By connecting an ejector in front of the vacuum pump it is possible to decrease the pressure to 10 mbar without cavitation. A realistic result at normal condition with a pressure of 20 mbar and a water temperature of 15 degrees C would be 10-20 μg O_2/kg or even lower. A plant with a DOR membrane is an interesting alternative for de-aeration of feedwater in plants without access to steam. The equipment is easy to handle and requires a minimum of maintenance. 3 refs, 9 figs, 1 tab

8178 (WHC-SD-TD-RPT–010) **Detection and quantitative analysis of ferrocyanide and ferricyanide: FY 93 Florida State University Raman spectroscopy report.** Mann, C.K. (Florida State Univ., Tallahassee, FL (United States). Dept. of Chemistry); Vickers, T.J. Westinghouse Hanford Co., Richland, WA (United States). 11 Oct 1994. 192p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95002365. Source: OSTI; NTIS; INIS; GPO Dep.

This report provides a summary of work to develop and investigate the feasibility of using Raman spectroscopy with tank waste materials. It contains Raman spectra from organics, such as ethylenediaminetetraacetic acid (EDTA), hydroxyethylenediaminetetraacteic acid (HEDTA), imino diacetic acid (IDA), kerosene, tributyl phosphate (TBP), acetone and butanol, anticipated to be present in tank wastes and spectra from T-107 real and BY-104 simulant materials. The results of investigating Raman for determining moisture content in tank materials are also presented. A description of software algorithms developed to process Raman spectra from a dispersive grating spectrometer system and an in initial design for a data base to support qualitative and quantitative application of remote Raman sensing with tank wastes.

4002 Inorganic, Organic, and Physical Chemistry

Refer also to citation(s) 7207, 7433, 7515, 7518, 8139, 8171, 8423

8179 (BNL–61084) **XAS studies of Ni(I), Ni(II), and Ni(III) complexes.** Furenlid, L.R.; Renner, M.W.; Fujita, E. Brookhaven National Lab., Upton, NY (United States). [1995]. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-9408131–5: 8. international conference on x-ray absorption fine structure, Berlin (Germany), 28 Aug - 2 sep 1994). Order Number DE95004844. Source: OSTI; NTIS; GPO Dep.

XAS techniques for studying structural and electronic changes taking place during oxidation and reduction reactions of nickel complexes are described and applied to selected models for Factor 430, a nickel containing cofactor catalyzing an important step in the conversion of carbon dioxide to methane by methanogenic bacteria.

8180 (DOE/BC/14882–9) **Responsive copolymers for enhanced petroleum recovery. Quarterly technical progress report, June 23–September 21, 1994.** McCormick, C.; Hester, R. University of Southern Mississippi, Hattiesburg, MS (United States). Dept. of Polymer Science. [1994]. 30p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC22-92BC14882. Order Number DE95005340. Source: OSTI; NTIS; GPO Dep.

Summaries are given on the technical progress on three tasks of this project. Monomer and polymer synthesis discusses the preparation of 1(7-aminoheptyloxymethyl)naphthalene and poly(maleic anhydride-alt-ethyl vinyl ether). Task 2, Characterization of molecular structure, discusses terpolymer solution preparation, UV analysis, fluorescence analysis, low angle laser light scattering, and viscometry. The paper discusses the effects of hydrophobic groups, the effect of pH, the effect of electrolyte addition, and photophysical studies. Task 3, Solution properties, describes the factorial experimental design for characterizing polymer solutions by light scattering, the light scattering test model, orthogonal factorial test design, linear regression in coded space, confidence level for coded space test mode coefficients, coefficients of the real space test model, and surface analysis of the model equations.

8181 (DOE/ER/14227–3) **Generation, detection and characterization of gas-phase transition metal aggregates and compounds. Final technical report, September 15, 1991–July 14, 1994.** Steimle, T.C. Arizona State Univ., Tempe, AZ (United States). Dept. of Chemistry and Biochemistry. 12 Nov 1994. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-91ER14227. Order Number DE95004439. Source: OSTI; NTIS; INIS; GPO Dep.

The goal of this research project has been to identify and characterize small gas-phase metal containing molecules and relate these properties to proposed reaction mechanisms. Of particular emphasis has been the elucidation of the mechanism for activation of C-H, N-H, S-H, and C-C bonds in CH_4, HCCH, H_2S and NH_3 by platinum, titanium, molybdenum, and niobium.

8182 (DOE/PC/92545–8) **Fischer Tropsch synthesis in supercritical fluids. Quarterly technical progress report, July 1, 1994–September 30, 1994.** Akgerman, A.; Bukur, D.B. Texas A and M Univ., College Station, TX (United States). Dept. of Chemical Engineering. [1995]. 53p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-92PC92545. Order Number DE95005206. Source: OSTI; NTIS; GPO Dep.

In pursuit of the diffusion coefficients of Fischer-Tropsch products in supercritical fluids, the objectives for this quarter were to continue the work on effective density measurements. Some data were to be obtained and calculations of effective diffusivities were to be made. Once the effective diffusivity is known, then also knowing the molecular diffusivity, the tortuosity factor can be obtained. The porosity has been determined from independent experiments. Knowing the tortuosity and the porosity the only property that is needed to back calculate the effective diffusivity in a wide range of reactor conditions is the molecular diffusivity at those reaction conditions.

8183 (IA–1486, pp. 3) **Three-dimensional quantum mechanical study of exothermic reactive systems ($F+H_2$; $Ar+h^+_2$) employing imaginary arrangement decoupling potentials.** Gillbert, M. (Barcelona Univ. (Spain)); Last, I.; Baram, A.; Baer, M. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. ARGON HYDRIDES/dissociation energy; HYDROFLUORIC ACID/dissociation energy; QUANTUM MECHANICS; QUANTUM NUMBERS; VIBRATIONAL STATES

8184 (IA–1486, pp. 4) **Quantum mechanical cross sections for $D+H_2$ and $H+D_2$ reactive systems. Application of the negative imaginary potentials within the j_Z approximation.** Baram, A.; Last, I.; Baer, M. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. DEUTERIUM/isotopic exchange; HYDROGEN/isotopic exchange; ATOMS; CHEMICAL REACTIONS; CROSS SECTIONS; DEUTERIUM; HYDROGEN; MOLECULES; QUANTUM MECHANICS; QUANTUM NUMBERS

8185 (IA–1486, pp. 4) **Integral and differential cross sections for the Li+HF->LIF+H process. A comparison between j_Z quantum mechanical and experimental results.** Baer, M.; Loesch, H.J.; Werner, H.J.; Last, I. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. HYDROGEN/fluorination; LITHIUM/fluorination; DIFFERENTIAL CROSS SECTIONS; ENERGY LEVELS; EXCITED STATES; EXPERIMENTAL DATA; HYDROFLUORIC ACID; HYDROGEN; FLUORINATION; INTEGRAL CROSS SECTIONS; LITHIUM; LITHIUM FLUORIDES; NUMERICAL ANALYSIS

8186 (IA–1486, pp. 6) **Three-dimensional reactive quantum mechanical study for the H_2+X_2 (X=H,D,T) systems. Application of negative imaginary arrangement decoupling potentials.** Last, I.; Baram, A.; Sczichman, H.; Baer, M. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. HYDROGEN ISOTOPES/isotopic exchange; DECOUPLING; DEUTERIUM; ENERGY-LEVEL TRANSITIONS; EXCITATION; HYDROGEN; HYDROGEN TRANSFER; POTENTIALS; QUANTUM MECHANICS; SPECTRAL SHIFT; THREE-DIMENSIONAL CALCULATIONS; THRESHOLD ENERGY; TRAJECTORIES; TRITIUM; VIBRATIONAL STATES

8187 (INIS-mf–13801, pp. RC14) **Crystallite size distribution in the synthesis of γ - $LiAlO_2$.** Carrera, L.M. (Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico));

Jimenez-Becerril, J.; Bulbulian, S.; Bosch, P. Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico); Instituto de Investigaciones Electricas, Cuernavaca (Mexico); Universidad Autonoma del Estado de Morelos (UAEM), Cuernavaca (Mexico). 1992. 30p. (CONF-9208272--: 9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry, Cuernavaca (Mexico), 16-21 Aug 1992). In *9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry. Abstracts.* Order Number DE95611878. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. CRYSTALS/synthesis; GRAIN SIZE/distribution; COMPUTER CODES; CORRELATIONS; CRYSTALS; SYNTHESIS; FOURIER TRANSFORMATION; DISTRIBUTION; IRRADIATION; LITHIUM OXIDES; TRITIUM

8188 (KAERI/RR–1322/94) **Development of Long-lived radionuclide partitioning technology -Development of Long-lived radionuclide transmutation technology.** Yoo, Jae Hyeong (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Shin, Yeong Joon; Lee, Il Hee; Yang, Han Beom; Kim, Kwang Uk; Jeong, Dong Yong; Lim, Jae Kwan; Lee, Won Kyeong; Kim, Won Ho; Kim, Eung Ho; Kim, Yeong Hwan; Kwon, Seon Kil; HwangKorea Cancer Center Hospital, Seoul (Korea, Republic of). Jul 1994. 385p. (In Korean). Order Number DE95611876. Source: OSTI; NTIS; INIS.

This study has been focused on the development of an indigenous partitioning process by modifying and complementing the reported processes. First of all, we tried to approach several unit separation processes in order to identify their adoptability to the partitioning of long-lived radionuclides. There are several unit separation methods - adsorption, precipitation, ion exchange, and solvent extraction etc. which are often used in ore processing or metal purification processes. With the unit processes chosen in this study, the following experiments have been carried out to provide technical facts necessary to develop a partitioning process. (1) Removal of a small amount of uranium by extraction with TBP from simulated waste solution (2) Destruction of nitric acid by use of formic acid (3) Co-precipitation of minor actinides and lanthanides. (4) Partitioning of minor actinides and lanthanides by extraction with HDEHP (5) Partitioning of minor actinides and lanthanides by ion exchange.

8189 (KAERI/RR–1384/93) **A study on the treatment of industrial wastewater containing heavy metals.** Yoon, Myung Hwan (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Chang, In Soon; Park, Jang Jin; Lee, Yoon Hwan; Shin, Jin Myung. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Aug 1994. 106p. (In Korean). Order Number DE95612704. Source: OSTI; NTIS; INIS.

In order to practically use the acornic acid process for treating heavy metal contained wastewater, the pilot plant of 2.4 ton (wastewater)/day capacity was designed, constructed and operated. An electroplating wastewater originated from a company was treated with NaOH, acornic acid (60 ppm) and salt (1000 ppm) in this pilot plant. The COD, Cr, Fe and Zn cocentrations of treated water were 123, 0.08, 0.05 and 0.08 ppm, respectively. These values were all satisfied with the legal effluent limits. (Author).

8190 **ADMPT and its synthesis.** Coburn, M.D.; Ott, D.G. To Dept. of Energy. 1992. Filed date 24 Nov 1992. U.S. Patent Application 7-980,888. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. Order Number DE95006104. Source: OSTI; NTIS (US Sales Only); GPO Dep.

This invention is 3-amino-6-(3,5-dimethylpyrazol-1-y1)-1,2,4,5-tetrazine (compound 8, ADMPT) and a method of making it. Triaminoguanidine monohydrochloride (compound 1) in water solution is combined with 2,4-pentanedione (compound 2) to form a precipitate comprised of 3,6-bis(3,5-dimethylpyrazol-1-y1)-1,2-dihydro-1,2,4,5-tetrazine (compound 3). A mixture of compound 3 in a suitable solvent is contacted with nitric oxide (NO) or nitrogen dioxide (NO_2) to form 3,6-bis(3,5-dimethylpyrazol-1-y1)-1,2,4,5-tetrazine (compound 4). The NO or NO_2 is then removed from the mixture by passing an inert gas through the mixture or, alternatively, compound 4 is separated from the mixture and mixed with fresh solvent to form a mixture free of NO and NO_2. The mixture is contacted with ammonia (NH_3) at a temperature less than about 35 C to form compound 8 and 3,5-dimethyl-1H-pyrazole (compound 7). A preferred solvent for the oxidation is 1-methyl-2-pyrrolidinone (NMP) and for the ammonolysis is toluene.

8191 (PNL-SA–24552) **Small angle X-ray scattering studies of aggregation in supercritical fluid solutions.** Fulton, J.L.; Pfund, D.M. Pacific Northwest Lab., Richland, WA (United States). Oct 1994. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-9410114–4: 3. international symposium on supercritical fluids, Strasbourg (France), 17-19 Oct 1994). Order Number DE95004576. Source: OSTI; NTIS; GPO Dep.

Small-angle X-ray scattering (SAXS) can be used to derive structural information on molecular aggregates having sizes from 2 to 200 nm. Not only is the technique useful for probing fluid structure in pure and simple binary supercritical fluid systems, but the technique is also well suited to investigate a range of much more complex multi-molecular aggregates that form when surfactants are added to supercritical fluids. The authors describe the experimental apparatus that was constructed for these studies and the experimental approach used to collect the scattering data. They present scattering results for pure fluids and for fluids containing various types of microemulsion phases, including reverse micelle and normal micelle phases. These results demonstrate that SAXS is a powerful technique for probing various types of molecular aggregation in supercritical fluid solutions.

8192 (PNL-SA–25345) **A solubility model for amorphous silica in concentrated electrolytes.** Felmy, A.R.; Schroeder, C.C.; Mason, M.J. Pacific Northwest Lab., Richland, WA (United States). Aug 1994. 21p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-940813–33: 208. American Chemical Society national meeting, Washington, DC (United States), 21-26 Aug 1994). Order Number DE95004896. Source: OSTI; NTIS; GPO Dep.

Silica is one of the major constituents of the earth's crust and is ubiquitously present in most natural materials. The solubility of silica and other silica-containing compounds is, therefore, of primary concern in geochemistry and in chemical processing applications where silica scale formation, resulting from changes in temperature and electrolyte composition, can cause problems in process design and operation. This paper describes the development of an aqueous thermodynamic model for accurately predicting the solubility of amorphous silica and other silica-containing compounds in the system Na^+-H^+-Mg^{2+}-NO_3^--SO_4^{2-}-Cl^--H_2O to high concentration and across the temperature range 25–100 C. This model, which utilizes the aqueous thermodynamic model of Pitzer, includes only one dissolved silica species, H_4SiO_4(aq), and is valid in neutral to very acidic solutions. The model is parameterized from the extensive set of solubility data in the literature as well as from new experimental data on amorphous silica solubility in HNO_3 and HCl developed as part of this study. The accuracy of the model is tested on solutions more complex than those used in model parameterization.

8193 (SAND–94-1693C) **Disilene Addition to C_{70}.** Jacobs, S.J. (Sandia National Labs., Albuquerque, NM (United States)); Cahill, P.A.; Rohlfing, C.M. Sandia National Labs., Albuquerque, NM (United States). [1994]. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. (CONF-941144–37: 1994 fall meeting of the Materials Research Society (MRS), Boston, MA (United States), 28 Nov - 2 dec 1994). Order Number DE95006321. Source: OSTI; NTIS; GPO Dep.

Semiempirical and ab initio Hartree Fock computational results indicate that the highly reactive dienophile tetramethyldisilene, $Me_2Si{=}SiMe_2$, is an excellent candidate for a novel functionalization of the equator of C_{70} via a [2+4] cycloaddition to the 21, 22, 23, 42 carbons. Thermal or photochemical generation of tetramethyldisilene in the presence of C_{70} results in similar complex mixtures in which the major product appears to be that of [2+2] cycloaddition to the 7,8 carbons of C_{70}. A minor product clearly results from [2+2] cycloaddition to the 1,9 carbons. Both of these products are hydrolytically unstable and are converted nonspecifically to mixtures of 1,9- and 7,8-$C_{70}H_2$ which are also present in HPLC traces of the reaction mixtures.

8194 (SAND–94-3183C) **Synthesis and characterization of FE colloid catalysts in inverse micelle solutions.** Martino, A. (Sandia National Labs., Albuquerque, NM (United States)); Sault, A.G.; Kawola, J.S.; Stoker, M.; Hicks, M.; Bartholomew, C.H. Sandia National Labs., Albuquerque, NM (United States). [1995]. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. (CONF-950402–2: 209. American Chemical Society national meeting, Anaheim, CA (United States), 2-7 Apr 1995). Order Number DE95006313. Source: OSTI; NTIS; GPO Dep.

Formation of Fe clusters in inverse micelles was studied. Iron salts are solubilized within the polar interior of inverse micelles, and addition of $LiBH_4$ initiates reduction to produce monodisperse, nanometer-sized Fe based particles. The reaction sequence is sustained by material exchange between inverse micelles. Surfactant interface provides a spatial constraint on reaction volume, and reactions carried out in these micro-heterogeneous solutions produce colloidal sized particles (10–100 Å) stabilized in solution against flocculation by surfactant. In this paper, the clusters were characterized using TEM, Moessbauer spectroscopy, electron diffraction, and x-ray photoelectron spectroscopy.

8195 (SKB-TR–94-10) **Project Caesium - An ion exchange model for the prediction of distribution coefficients of caesium in bentonite.** Wanner, H. (MBT Umwelttechnik AG, Zuerich (Switzerland)); Wieland, E.; Albinsson, Y. Swedish Nuclear Fuel and Waste Management Co., Stockholm (Sweden). Jun 1994. 44p. Order Number DE95611797. Source: OSTI; NTIS; INIS.

A surface chemical model is established to thermodynamically describe caesium sorption on bentonite. Caesium sorption is studied on Wyoming bentonite MX-80 in solutions of NaCl, KCl, $MgCl_2$, $CaCl_2$, $NaNO_3$ and $Ca(NO_3)_2$ of concentrations varying between 0.025M and 1M, as well as in the weakly saline Allard groundwater and the strongly saline Aespoe groundwater. Based on these experiments it is shown that the sorption behaviour of caesium on bentonite can be described, within the experimental and model uncertainties, in terms of a one-site ion exchange model. The ion exchange constant for the replacement of Na^+ on montmorillonite by Cs^+ is $\log K_{ex}$ degrees = 1.6. The model predictions compare well with sorption data published in the open literature on both Wyoming bentonite MX-80 and other types of bentonite. For the analysis of diffusion experiments in compacted bentonite, the apparent diffusivity of tritiated water, HTO, is used as an analogue to estimate the pore diffusivity of Cs^+. Since insufficient information is available at present to estimate the porosity actually available for diffusion in compacted bentonite, it is assumed that the diffusion porosity can be approximated by using the value of the bulk porosity. Under these circumstances, the cation ex change capacity (CEC) found to be available for the diffusing species in compacted bentonite corresponds to about 12% of the total CEC of bentonite. It is recognised that the errors made in the estimation of the pore diffusivity and of the diffusion porosity are contained in the reduction factor of the CEC. A discussion of the factors affecting the diffusivities of radionuclides and the problem of establishing consistent sets of diffusivity data is given in the Appendix. 33 refs, 7 figs, 12 tabs.

4004 Electrochemistry

Refer also to citation(s) 7145, 7833, 8072

4005 Photochemistry

Refer also to citation(s) 7145, 7585, 8193, 8462

4006 Radiation Chemistry

Refer also to citation(s) 7520, 8214

8196 (ANL/CHM/CP–84392) **Time-resolved EPR studies of the H atom: A stable heavy isotope of muonium.** Bartels, D.M. Argonne National Lab., IL (United States). 4 Oct 1994. 17p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9406294–1: Royal Society/CIBA foundation meeting on trends in muonium chemistry, London (United Kingdom), 10 Jun 1994). Order Number DE95004614. Source: OSTI; NTIS; INIS; GPO Dep.

Muonium physicists and chemists, when they talk about "primary processes," are probably concerned mostly about end-of-track phenomena in the slowing down of a many-MeV charged particle, analogous to the proton. The author's experience is with electron accelerators and radiolysis; hence, he will comment briefly on the differences and relative advantages of electron and proton radiolysis for the study of H atoms, as opposed to muonium. Then, he will take the liberty of defining primary processes to include the recombination reactions that may occur between geminate or quasi-geminate free radicals within radiolysis spurs.

8197 (ANL/CHM/PP–82180) **Pulse radiolysis of alkanes: A time-resolved electron paramagnetic resonance study.** Shkrob, I.A. (Argonne National Lab., IL (United States). Chemistry Division); Trifunac, A.D. Argonne National Lab., IL (United States). 14 Feb 1994. 42p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. Order Number DE95005831. Source: OSTI; NTIS; INIS; GPO Dep.

Time-resolved spin-echo-detected electron paramagnetic resonance (EPR) was applied to examine short-lived alkyl radicals formed in pulse radiolysis of liquid alkanes. It was found that the ratio of yields of penultimate and interior radicals in n-alkanes at the instant of their generation is temperature-independent and is ca. 1.25 times greater than the statistical quantity. This higher-than-statistical production of penultimate radicals indicates that the fast ion molecule reactions involving radical cations are a significant route of radical generation. The analysis of spin-echo kinetics in n-alkanes suggests that the alkyl radicals are emissively polarized in spur reactions. this initial polarization rapidly increases with shortening of the aliphatic chain. Another finding is that a long-chain structure of these radicals results in much higher rate of Heisenberg spin exchange relative to the recombination rate. The relative yields of hydrogen abstraction and fragmentation for various branched alkanes are estimated. It is concluded that the fragmentation occurs prior to the formation of radicals in an excited precursor species. Effects of phenolic and alkene additives in radiolysis of n-alkanes are examined. It is demonstrated that phenoxy radicals are produced in dissociative capture of electrons and alkane holes. Another route is a reaction of phenols with free hydrogen atoms. A rapid transfer of singlet correlation from the geminate radical ion pairs is responsible for unusual polarization patterns in the phenoxy and cyclohexadienyl radicals. The significance of these results in the context of cross-linking in polyethylene and higher paraffins is discussed. 56 refs.

8198 (DOE/ER/60617–6) **[Ionization in liquids: Request for 1992–1993 funding and 1991–1992 progress report].** Case Western Reserve Univ., Cleveland, OH (United States). [1992]. 29p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-88ER60617. Order Number DE95005798. Source: OSTI; NTIS; INIS; GPO Dep.

Studies of the influence of solvent composition on electron mobility, μ_e, which we reported for mixtures of neopentane (NP) and tetramethysilane (TMS) were extended to mixtures of TMS with isooctane (i-octane) or cyclohexane (c-hexane). Whereas our initial TMS /NP study focused on an electron transport regime in which μ_e varied only from 67 cm^2/Vs in NP to 100 cm^2/Vs in TMS, the more recent studies extended to values of μ_e of 7.5 and 0.22 cm^2/Vs in i-octane and c-hexane, respectively. Whereas a linear dependence of log μ_e on solvent composition had been found in earlier studies of electron transport in mixtures, a negative deviation from this dependence was found in TMS/NP mixtures. In contrast, a positive deviation from linearity was observed in TMS/c-hexane mixtures. Despite the markedly different dependences of μ_e on solvent composition for these mixtures, the observed dependences are consistent with the percolation model of electron transport that Schiller has developed.

8199 (DOE/ER/60617–7) **Ionization in liquids. Progress report, November 1, 1990–October 31, 1993.** Bakale, G. Case Western Reserve Univ., Cleveland, OH (United States). 30 Apr 1993. 16p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-88ER60617. Order Number DE95005799. Source: OSTI; NTIS; INIS; GPO Dep.

Studies on use of buckminister fullerines as a test subject to understand electron-related processes in radiobiology are described.

8200 (DOE/ER/60617–8) **Ionization in liquids [annual] progress report, 1993–1994.** Bakale, G. Case Western Reserve Univ., Cleveland, OH (United States). [1994]. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-88ER60617. Order Number DE95005800. Source: OSTI; NTIS; INIS; GPO Dep.

Progress in 1993–94 was focused on delineating how ions of the model nonpolar spherical solute Buckminsterfullerene interact differently with various nonpolar solvents than does the ellipsoidal fullerene analog C-70, and exposing a variety of new audiences to the electrophilicity-carcinogenicity relationship in order to obtain fresh insight into this relationship that may lead to elucidation of the role of electrons in carcinogenesis and thereby a better understanding of the biological effects of ionizing radiation. To achieve these goals a new collaboration was established with scientists at Oak Ridge National Lab who have unique facilities to characterize fullerene and its radiolytic products.

8201 (INIS-mf–13801, pp. RC4) **Photochemical reactions of $CuInSe_2$ thin films in sulphuric acid solution.** Fernandez-Valverde, S. (Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico)); Ordonez-Regil, E.; Solorza Feria, O.; Rivera, R. Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico); Instituto de Investigaciones Electricas, Cuernavaca (Mexico); Universidad Autonoma del Estado de Morelos (UAEM), Cuernavaca (Mexico). 1992. 30p. (CONF-9208272–: 9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry, Cuernavaca (Mexico), 16-21 Aug 1992). In *9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry. Abstracts.* Order Number DE95611878. Source: OSTI; NTIS (US Sales Only); INIS.

When electrodeposited on SnO_2, $CuInSe_2$ thin films appear as p-type semiconductors. The photoresponse of such semiconductors has been studied in sulphuric acid aqueous solutions, as well as in a (0.1 M H_2SeO_3 + 0.5 M H_2SO_4) aqueous solution. In this latter case, besides the photocurrent response, the formation of a selenium thin film was observed. The results for hydrogen production in the $CuInSe_2$ thin films or in the newly formed phase ($CuInSe_2$ /Se), accordingly, are presented and compared with those obtained with usual metallic electrodes. (Author).

8202 (INIS-mf–13801, pp. RC5) **The influence of ionizing radiation on the formation of polymeric material from aqueous malononitrile.** Negron Mendoza, A.; Albarran, G. Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico); Instituto de Investigaciones Electricas, Cuernavaca (Mexico); Universidad Autonoma del Estado de Morelos (UAEM), Cuernavaca (Mexico); Universidad Nacional Autonoma de Mexico, Mexico City (Mexico). Centro de Estudios Nucleares. 1992. 30p. (CONF-9208272–: 9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry, Cuernavaca (Mexico), 16-21 Aug 1992). In *9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry. Abstracts.* Order Number DE95611878. Source: OSTI; NTIS (US Sales Only); INIS.

The CN group might have made it appearance in the early stages of chemical evolution, for this reason the radiolytic behavior of nitriles have relevance to the study of prebiotic chemistry. A systematic study of the influence of the irradiation on nitriles and dinitriles have been carried at ICN. In this paper we present the formation of polymeric material from the γ irradiation of aqueous solutions of malonitrile 0.1 M, oxygen free, at their natural ph s. The analysis of the radiolytic product was by exclusion chromatography, some characteristics of the polymer material were found by IR spectroscopy, Biuret test, etc. The results showed that in this system several polymeric materials are formed with a molecular weight about 10,000 daltons. (Author).

8203 (INIS-mf–13801, pp. RC6) **Action of glow discharge on organic solids: primary radiation-chemical processes, formation of radical distribution, radical reactions and application.** Raitsimring, A. (Arizona Univ., Tucson, AZ (United States). Dept. of Chemistry). Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico); Instituto de Investigaciones Electricas, Cuernavaca (Mexico); Universidad Autonoma del Estado de Morelos (UAEM), Cuernavaca (Mexico). 1992. 30p. (CONF-9208272–: 9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry, Cuernavaca (Mexico), 16-21 Aug 1992). In *9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry. Abstracts.* Order Number DE95611878. Source: OSTI; NTIS (US Sales Only); INIS.

In this report the new experimental method for solving the problem of the radical recombination in organic solids is suggested. The act of recombination requires diffusion, encounters and the reaction between radicals. To understand the regularities of the recombination demands independent investigation diffusion and reaction as well. Until now the application of electron spin resonance for investigation of the radical recombination yielded only the dependence of the amount of the radicals N (t) in the sample on time and did not allow to solve the problem of the limiting stage of the recombination process. (Author).

8204 (INIS-mf–13801, pp. RC7) **Identification of irradiated mangoes by the electron spin resonance technique.** Romero Juarez, M. A.; Ramirez, M. E.; Gutierrez, A. Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico); Instituto de Investigaciones Electricas, Cuernavaca (Mexico); Universidad Autonoma del Estado de Morelos (UAEM), Cuernavaca (Mexico). 1992. 30p. (CONF-9208272–: 9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry, Cuernavaca (Mexico), 16-21 Aug 1992). In *9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry. Abstracts.* Order Number DE95611878. Source: OSTI; NTIS (US Sales Only); INIS.

The espectrometric technique of Electron Spin Resonance (ESR) is based in the detection of magnetic centers, a property that free radicals present due to the odd electron. This property has been used for the identification of the irradiated foods. (Author).

8205 (INIS-mf–13801, pp. RC8) **Elimination of organics chemicals in aqueous solutions by gamma radiation processing.** Arzate O, O.; Vazquez A, O.; Moreno A, J. Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico); Instituto de Investigaciones Electricas, Cuernavaca (Mexico); Universidad Autonoma del Estado de Morelos (UAEM), Cuernavaca (Mexico). 1992. 30p. (CONF-9208272–: 9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry, Cuernavaca (Mexico), 16-21 Aug 1992). In *9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry. Abstracts.* Order Number DE95611878. Source: OSTI; NTIS (US Sales Only); INIS.

The objective this work was to evaluate the gamma radiation processing for elimination of organic contaminants on industrial wastewater. Standard samples with 17 hydrocarbons (acetophenone, anisole, benzene, chlorobenzene, cyclohexanone, N, N-dimethylaniline, phenol, naphtalene, 1-chloronaphtalene, n-octadecane, p-nitrotoluene, toluene, tetrachloroethane, tetramethylbenzene, n-undecane, m-xylene and o-xylene) was preparated in hexane with total concentration of 1 μ g/μ l which was analyzed by gas chromatography. Other sample with the same concentration of these hydrocarbons in acetone was used to contaminate water samples, which were irradiated with gamma radiation from Co-60 between doses 5.0 to 20.0 KGy and dose rate of 1.162 KGy/h. The activity of source was 1470 Ci. Percents destruction of hydrocarbons were: 79.76 % to 5.0 KGy, 85.97 % to 7.5 KGy, 86.24 % to 10.0 KGy, 86.72 % to 12.5 KGy, 88.92 % to 15.0 KGy, 91.74 % to 17.5 KGy and 92.38 % to 20.0 KGy. The conclusion of this paper is that the radiation processing is efficient to eliminate hydrocarbons on aqueous solutions in direct proportion to the processing doses at this dose rate. (Author).

8206 (INIS-mf–13801, pp. RC9) **Characterization of MMA/LDPE copolymer films obtained by gamma radiation.** Zaldivar, M.E.; Lopez, R.; Sanchez, V.; Fucugauchi, L.A. Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico); Instituto de Investigaciones Electricas, Cuernavaca (Mexico); Universidad Autonoma del Estado de Morelos (UAEM), Cuernavaca (Mexico). 1992. 30p. (CONF-9208272–: 9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry, Cuernavaca (Mexico), 16-21 Aug 1992). In *9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry. Abstracts.* Order Number DE95611878. Source: OSTI; NTIS (US Sales Only); INIS.

Gamma induced grafting in crystalline or vitreous polymers produces a number of polymer radicals which remain trapped in the rigid polymer matrix. Grafting takes place during the diffusion process and it is accomplished as soon as the polymer is swollen upon which the radicals acquire enough mobility to combine among them. Since graft polymerization involves processes such as polymeric free-radicals generation, monomer molecules penetration and incorporation into the polymer matrix, it provides a promising field for the application of the Positron Annihilation Lifetime (PAL) technique. In the present work PAL was applied to the study of the microstructure of the graft copolymer of methyl methacrylate (MMA) onto low-density polyethylene (LDPE). Micrographs were taken along the copolymer formation process which show a characteristic morphology of graft copolymers. Direct method of g-induced graft polymerization was the best technique to carry on the preparation of the MMA/LDPE copolymer. (Author).

8207 (INIS-mf–13801, pp. RC10) **Impedance measurement of irradiated potatoes: a method to identify radiation processing.** Del Mastro, N.L. (Instituto de Pesquisas Energeticas e Nucleares (IPEN), Sao Paulo, SP (Brazil)); Villavicencio, A.L.C.H. Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico); Instituto de Investigaciones Electricas, Cuernavaca (Mexico); Universidad Autonoma del Estado de Morelos (UAEM), Cuernavaca (Mexico). 1992. 30p. (CONF-9208272–: 9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry, Cuernavaca (Mexico), 16-21 Aug 1992). In *9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry. Abstracts.* Order Number DE95611878. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. IMPEDANCE/potatoes; RADIATION DOSES/electrodes; CHEMICAL RADIATION EFFECTS; COBALT 60; IMPEDANCE; POTATOES; IONS; ELECTRODES; SALMONELLA; STORAGE; TISSUES

8208 (INIS-mf–13801, pp. RC11) **Reduction of phenols, detergents and coliform bacteria in samples of waste water by gamma radiation processing.** Moreno A, J. (Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico)); Vazquez A, O.; Arzate O, O.; Colin C, A. Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico); Instituto de Investigaciones Electricas, Cuernavaca (Mexico); Universidad Autonoma del Estado de Morelos (UAEM), Cuernavaca (Mexico). 1992. 30p. (CONF-9208272–: 9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry, Cuernavaca (Mexico), 16-21 Aug 1992). In *9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry. Abstracts.* Order Number DE95611878. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. DECONTAMINATION/phenols; GAMMA RADIATION/waste water; COBALT 60; COLIFORMS; CONCENTRATION RATIO; DECONTAMINATION; PHENOLS; DETERGENTS; RADIATION DOSES; SAMPLE PREPARATION

8209 (INIS-mf–13801, pp. RC13) **Effects of chain orientation on the radiation response of atactic polystyrene.** Martinez-Pardo, M.E. (Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico)); McHerron, D.; Wilkes, G.L. Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico); Instituto de Investigaciones Electricas, Cuernavaca (Mexico); Universidad Autonoma del Estado de Morelos (UAEM), Cuernavaca (Mexico). 1992. 30p. (CONF-9208272–: 9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry, Cuernavaca (Mexico), 16-21 Aug 1992). In *9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry. Abstracts.* Order Number DE95611878. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. DICHROISM/polystyrene; RADIATION DOSES/thin films; DICHROISM; POLYSTYRENE; GEL PERMEATION CHROMATOGRAPHY; IRRADIATION; MOLECULAR WEIGHT; POLYMERIZATION; SAMPLING

8210 (JINR-D–15-93-80, pp. 114-119) **Radiation-induced synthesis and properties of fluorine-containing cation-exchange membranes.** Kostov, G.N.; Atanasov, A.N. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1993. 119p. (In Russian). (CONF-9209490–: Workshop on application of microtrons in nuclear physics, Plovdiv (Bulgaria), 22-24 Sep 1992). In *Microtron MT-25. Workshop on application of microtrons in nuclear physics.* Order Number DE95611718. Source: OSTI; NTIS (US Sales Only); INIS.

Radiation-induced copolymerization of acrylic acid on films of tetrafluoroethylene-ethylene copolymers of different composition is studied. Hydrophilic carboxyfluoropolymers have been synthesized and some characteristics of cation-exchange membranes prepared on the basis of the polymers are studied. 15 refs., 1 fig., 2 tabs.

8211 (KAERI/RR–1381/93) **A study on the treatment of non-biodegrable wastewater by using radiation.** Lee, Myeon Joo (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Jin, Jun Ha; Yoon, Byeong Mok; Kim, Sam Rang; Yim, Moon Ho. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Aug 1994. 37p. (In Korean). Order Number DE95612007. Source: OSTI; NTIS; INIS.

This study was carried out for decomposition of tert-butanol which has been called non-biodegradable wastewater by using gamma radiation combined with ozone. When tert-butanol was oxidized by ozone combined with irradiation, a large amount of tert-butanol could be not only easily converted into by-products, such as organic acid, but also oxidized to final products. The irradiation acts an important roll of production of O_2^- radical which is essential in decomposition of tert-butanol. (Author).

4007 Radiochemistry and Nuclear Chemistry

Refer also to citation(s) 7430, 8421

8212 (ANL/EP/SUMM–84774) **Modeling of tritium recovery from lithium ceramics.** Billone, M.C. Argonne National Lab., IL (United States). [1995]. 27p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9111175–2: 2. workshop on ceramic breeder interaction, Clearwater, FL (United States), 22-23 Nov 1991). Order Number DE95004626. Source: OSTI; NTIS (US Sales Only); GPO Dep.

Includes viewgraphs.

The TIARA and DISPL2 codes are being developed at Argonne National Laboratory to predict tritium retention and release from lithium ceramics under steady-state and transient conditions, respectively. Emphasis has been placed on tritium behavior in Li_2O because of the selection of this ceramic as a first option for the ITER driver blanket and because of the excellent materials properties data base for Li_2O. In this paper, the results of validation of TIARA to tritium retention data from VOM-15H, EXOTIC-2, and CRITIC-1 are presented, along with predictions of tritium retention in BEATRIX-11. For DISPL2, results are presented for tritium release predictions vs. data for MOZART, CRITIC-1, and BEATRIX-11.

8213 (IA–1486, pp. 119-120) **The use of microwave oven for ^{51}Cr (CrIII) complexation reactions.** Freud, A.; Canfi, A. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. RADIOPHARMACEUTICALS/chemical preparation; CHEMICAL REACTION YIELD; CHEMICAL REACTIONS; CHROMIUM COMPLEXES; CHROMIUM 51; EDTA; FURNACES; MICROWAVE HEATING; PH VALUE; RADIOPHARMACEUTICALS; RADIOWAVE RADIATION; TEMPERATURE RANGE 0273-0400 K; VALENCE

8214 (INIS-mf–13801) **9. International symposium on nuclear chemistry, radiochemistry and radiation chemistry. Abstracts.** Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico); Instituto de Investigaciones Electricas, Cuernavaca (Mexico); Universidad Autonoma del Estado de Morelos (UAEM), Cuernavaca (Mexico). 1992. 30p. (CONF-9208272–: 9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry, Cuernavaca (Mexico), 16-21 Aug 1992). Order Number DE95611878. Source: OSTI; NTIS (US Sales Only); INIS.

The report presents the abstracts of 30 contributions covering mainly photochemical reactions, irradiation of organic chemicals, gamma-radiation in wastewater treatment, PIXE analysis, and some aspects of nuclear spectroscopic instrumentation in radiochemical analysis.

8215 (INIS-mf–13801, pp. NAT1) **Application of the species existence-predominance and distribution diagrams to the plutonium and americium electrodeposition.** Becerril, A. (Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico)); Meas, Y.; Rojas, A. Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico); Instituto de Investigaciones Electricas, Cuernavaca (Mexico); Universidad Autonoma del Estado de Morelos (UAEM), Cuernavaca (Mexico). 1992. 30p. (CONF-9208272–: 9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry, Cuernavaca (Mexico), 16-21 Aug 1992). In *9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry. Abstracts.* Order Number DE95611878. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. AMERICIUM/electrodeposition; PLUTONIUM/diagrams; AMERICIUM; ELECTRODEPOSITION; CONCENTRATION RATIO; ELECTROLYTES; HYDROXIDES; OXIDES; PH VALUE; PLUTONIUM; DIAGRAMS; SULFATES

8216 (INIS-mf–13801, pp. RC15) **Sorption of radioactive Cobalt by sepiolite.** Munoz, G.B. (Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico)); Bulbulian, S.; Bosch, P. Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico); Instituto de Investigaciones Electricas, Cuernavaca (Mexico); Universidad Autonoma del Estado de Morelos (UAEM), Cuernavaca (Mexico). 1992. 30p. (CONF-9208272–: 9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry, Cuernavaca (Mexico), 16-21 Aug 1992). In *9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry. Abstracts.* Order Number DE95611878. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. CLAYS/ion exchange; COBALT 60/sorption; CLAYS; SORPTION; MAGNESIUM SILICATES; RADIOACTIVE WASTES; SODIUM IONS; WASTE WATER; X-RAY DIFFRACTION; ZEOLITES

8217 (INIS-mf–14449) **Sorption of radioactive cobalt with sepiolite and erionite.** Bonifacio M, G. Universidad Autonoma Metropolitana, Mexico City (Mexico). 1994. 73p. (In Spanish). Order Number DE95614822. Source: OSTI; NTIS (US Sales Only); INIS.

^{60}Co present in aqueous solutions may be sorbed in clays or zeolites. If the solids are suspended in aqueous solutions, the cations of the solids may be exchanged with $^{60}Co^{2+}$ ions present in the solutions. Natural aluminosilicate are used for separation of radioactive cations which are present in waste liquids from radiochemical laboratories. The natural sepiolite lattice is almost neutral, having a cation exchange capacity in the order of 0.05 meg/g. It is shown that mild treatment with NaOH solution (2M) results in partial substitution by cations present in the natural sepiolite, in the other hand, during treatment with $NaAlO_2$ in a 6N NaOH solution at 90 Centigrade degrees it has been produced an aluminated sepiolite resulting in partial Mg-by-Al substitution in the octahedral layer. The crystallinity of the samples before and after the ion exchange was studied by X-ray diffraction. The aim of this paper is to study the Co^{2+} ion exchange behavior in this aluminosilicate and to compare it with natural mexican erionite. The natural sepiolite from Vallecas, Spain is recommended as ^{60}Co adsorbent. This clay is directly obtained from the mineral field without any treatment. (Author).

8218 (ORNL/TM–12875) **Nuclear Medicine Program progress report for quarter ending September 30, 1994.** Knapp, F.F. Jr.; Ambrose, K.R.; Beets, A.L.; Lambert, C.R.; McPherson, D.W.; Mirzadeh, S.; Luo, H. Oak Ridge National Lab., TN (United States). Jan 1995. 18p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE95005909. Source: OSTI; NTIS; GPO Dep.

In this report we describe the synthesis of the Z (cis) isomers of R-l-azabicyclo [2.2.2] oct-3-yl R-and S-α-hydroxy-α-(liodo-l-propen-3-yl) - α-phenylacetate. We also report the results of the in vitro binding assays of the E and Z isomers of the (R, R)- and (R, S)-isomers of IQNP. The Z isomers of IQNP were prepared by there action of (R, R)- or (R, S)-l-azabicyclo [2.2.2] oct-3-yl - α - hydroxy - α - phenyl - α - (l-propyn-3-yl) acetate with tributyltin hydride in HMPA followed by subsequent reaction of the cis tributylstannyl substrate with iodine. In an attempt to increase the yield of the Z isomers, the preparation of the Z isomers of the R-or S-ethyl α-hydroxy-α-phenyl-α-(l-propyn-3-yl)acetate was also investigated under a variety of reaction conditions. Results of the in vitro binding assays demonstrated that although all the isomers showed high affinity for the muscarinic receptor, the E-(R, R)-IQNP isomer had a 100 times greater higher affinity for m_1 and m_3 receptor subtypes as compared to m_2 subtype. We are currently evaluating the in vivo biodistribution properties and pharmocokinetic and autoradiographic analyses of these promising new ligands in detail for potential use of the iodine-123-labeled agents to study muscarinic receptors by Single Photon Emission Computed Tomography (SPECT).

8219 (STUDSVIK-M–94-86) **Chemistry in water reactors.** Hermansson, H.P.; Norring, K. Studsvik Material AB, Nykoeping (Sweden). 14 Jul 1994. 39p. (In Swedish). Order Number DE95611879. Source: OSTI; NTIS; INIS.

The international conference Chemistry in Water Reactors was arranged in Nice 24-27/04/1994 by the French Nuclear Energy Society. Examples of technical program areas were primary chemistry, operational experience, fundamental studies and new technology. Furthermore there were sessions about radiation field build-up, hydrogen chemistry, electro-chemistry, condensate polishing, decontamination and chemical cleaning. The conference gave the impression that there are some areas that are going to be more important than others during the next few years to come. Cladding integrity: Professor Ishigure from Japan emphasized that cladding integrity is a subject of great concern, especially with respect to waterside corrosion, deposition and release of crud. Chemistry control: The control of the iron/nickel concentration quotient seems to be not as important as previously considered. The future operation of a nuclear power plant is going to require a better control of the water chemistry than achievable today. One example of this is solubility control via regulation in BWR. Trends in USA: means an increasing use of hydrogen, minimization of SCC/IASCC, minimization of radiation fields by thorough chemistry control, guarding fuel integrity by minimization of cladding corrosion and minimization of flow assisted corrosion. Stellite replacement: The search for replacement materials will continue. Secondary side crevice chemistry: Modeling and practical studies are required to increase knowledge about the crevice chemistry and how it develops under plant operation conditions. Inhibitors: Inhibitors for IGSCC and IGA as well for the primary- (zinc) as for the secondary side (Ti) should be studied. The effects and mode of operation of the inhibitors should be documented. Chemical cleaning: of heat transfer surfaces will be an important subject. Prophylactic cleaning at regular intervals could be one mode of operation.

4008 Combustion, Pyrolysis, and High-Temperature Chemistry

Refer also to citation(s) 7549, 7550, 7551, 8046, 8477

8220 (UCRL-JC–118634) **A higher-order projection method for the simulation of unsteady turbulent nonpremixed combustion in an industrial burner.** Pember, R.B.; Almgren, A.S.; Bell, J.B.; Colella, P.; Howell, L.; Lai, M. Lawrence Livermore National Lab., CA (United States). Dec 1994. 19p. Sponsored by USDOE, Washington, DC (United States);National Science Foundation, Washington, DC (United States). DOE Contract W-7405-ENG-48. (CONF-9407160–1: 8. international symposium on transport phenomena in combustion, San Francisco, CA (United States), 16-20 Jul 1994). Order Number DE95005919. Source: OSTI; NTIS; GPO Dep.

The modeling of transient effects in burners is becoming increasingly important. The problem of ensuring the safe performance of an industrial burner, for example, is much more difficult during the startup or shutdown phases of operation. The peak formation of pollutants is also much more dependent on transient behavior, in particular, on peak temperatures, than on average operating conditions. In this paper we present a new methodology for the modeling of unsteady, nonpremixed, reacting flow in industrial burners. The algorithm uses a second-order projection method for unsteady, low-Mach number reacting flow and accounts for species diffusion, convective and radiative heat transfer, viscous transport, turbulence, and chemical kinetics. The time step used by the method is restricted solely by an advective CFL condition. The methodology is applicable only in the low-Mach number regime (M

< .3), typically met in industrial burners. The projection method for low-Mach number reacting flow is an extension of a higher-order projection method for incompressible flow [9, 5, 3,4] to the low-Mach number equations of reacting flow. Our method is based on an approximate projection formulation. Radiative transport is modeled using the discrete ordinates method. The main goal of this work is to introduce and investigate the simulation of burners using a higher-order projection method for low-Mach number combustion. As such, the methodology is applied here only to axisymmetric flow in gas-fired burners for which the boundaries can be aligned with a rectangular grid. The perfect gas law is also assumed. In addition, we use a one-step reduced kinetics mechanism, a $\kappa - \epsilon$ model for turbulent transport, and a simple turbulent combustion model.

42 ENGINEERING

Refer also to citation(s) 7871, 8108, 8149

8221 (DOE/ER/75671–T1) **Report to the Department of Energy on the DOE/EPSCoR planning activities for the state of South Dakota.** South Dakota State Univ., Brookings, SD (United States). Dept. of Chemistry. Dec 1994. 29p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-91ER75671. Order Number DE95004699. Source: OSTI; NTIS; GPO Dep.

An extensive review of the current status of energy-related research and educational activities within the state of South Dakota was carried out. Information exchange meetings were conducted at the major research institutions as well as with many representatives of state government. Visits were also made to professional educators who are deeply involved with the state's principal minority group, the American Indian. Several activities in the human resource development area that will be carried out in the five-year implementation project were identified. Many of these will be closely coordinated with other efforts currently in progress under the auspices of the NSF SSI (Statewide Systemic Initiatives in Science, Mathematics, and Engineering Education) office. The authors will also work closely with AWU and other regional consortia to foster a higher level of participation in existing DOE programs and to develop adaptations and "follow-ons" that are tailored to the specific needs of South Dakota. Many of these programs will involve extensive interaction with DOE laboratories. Special programs will be carried out that are designed to keep a larger number of the Native American population in the science and engineering pipeline. An assessment of the research strengths of this state was made. With the assistance of external consultants, the authors identified two principal areas in which they have the potential to develop nationally competitive research programs that fall within DOE objectives. One is a comprehensive biomass systems study, and the other a water quality study as it relates to energy production.

8222 (SAND–95-0108C) **Failure analysis: Status and future trends.** Anderson, R.E.; Soden, J.M.; Henderson, C.L. Sandia National Labs., Albuquerque, NM (United States). [1995]. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. (CONF-950117–1: Workshop on semiconductor characterization, Gaithersburg, MD (United States), 30 Jan - 2 feb 1995). Order Number DE95006311. Source: OSTI; NTIS; INIS; GPO Dep.

Failure analysis is a critical element in the integrated circuit manufacturing industry. This paper reviews the changing role of failure analysis and describes major techniques employed in the industry today. Several advanced failure analysis techniques that meet the challenges imposed by advancements in integrated circuit technology are described and their applications are discussed. Future trends in failure analysis needed to keep pace with the continuing advancements in integrated circuit technology are anticipated.

4202 Facilities, Equipment, and Techniques

Refer also to citation(s) 7243, 7255, 7276, 7279, 7280, 7281, 7285, 7290, 7337, 7353, 7364, 7367, 7376, 7379, 7382, 7385, 7387, 7389, 7398, 7402, 7504, 7695, 7774, 7781, 7808, 8025, 8171, 8702

8223 (ANL/RE/PP–80322) **Rocking response of tanks containing two liquids.** Tang, Y. (Argonne National Lab., IL (United States). Reactor Engineering Div.). Argonne National Lab., IL (United States). [1995]. 32p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. Order Number DE95004598. Source: OSTI; NTIS; GPO Dep.

A study on the dynamic response of upright circular cylindrical liquid-storage tanks containing two different liquids under a rocking base motion with an arbitrary temporal variation is presented. Only rigid tanks were studied. The response quantities examined include the hydrodynamic pressure, sloshing wave height and the associated frequencies, base shear and moments. Each of these response quantities is expressed as the sum of the so-called impulsive component and convective component. Unlike the case of tanks containing one liquid, in which the response is controlled by one parameter, height-to-radius ratio, the response of tanks containing two different liquids are controlled by three parameters: height-to-radius ratio, and mass density ratio and height ratio of the two liquids. The interrelationship of the responses of the tank-liquid system to rocking and lateral base excitations is established by examining numerical results extensively. The study shows that some of the response quantities for tank-liquid system under a rocking base motion can be determined from the available data for the response of an identical tank under a horizontal base motion. Base rocking motion can occur in a ground-supported tank or in an elevated tank under earthquake motions.

8224 (ANL/RE/PP–80379) **Sloshing response of nonuniform density liquid in a laterally excited tank.** Tang, Y. (Argonne National Lab., IL (United States). Reactor Engineering Division). Argonne National Lab., IL (United States). [1995]. 23p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. Order Number DE95004589. Source: OSTI; NTIS; GPO Dep.

A study on the sloshing response of nonuniform density liquid in a tank undergoing lateral base excitations is presented. The system considered is a circular cylindrical tank containing a liquid whose density increases with the liquid depth. The density distribution along the depth can be of any arbitrary continuous function. In the analysis, the liquid field is divided into n layers. The thicknesses of the liquid layers can be different, but the density of each liquid layer is considered to be uniform and its value is assigned to be the value of the original liquid density at the mid-height of that layer. The problem is solved by the transfer matrix technique. The effect of the nonuniform liquid density on the sloshing response is illustrated in a numerical example in which the linear and cosine distributions of the liquid density are assumed. The response functions examined include the sloshing frequencies, surface wave height, and the associated convective hydrodynamic pressure. The results are presented in tabular and graphical forms. It is found that the natural frequencies of the sloshing motion for nonuniform density liquid are lower than those of the uniform density liquid of the same total depth contained in an identical tank. Also, it is shown that for nonuniform density liquid, the maximum sloshing wave height may increase significantly and the magnitude of the convective hydrodynamic pressure may be quite different compared with that of a uniform liquid contained in an identical tank.

8225 (BNL–52444) **Dynamic modeling and response of rigid embedded cylinders.** Veletsos, A.S.; Younan, A.H.; Bandyopadhyay, K. Brookhaven National Lab., Upton, NY (United States). Oct 1994. 43p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. Order Number DE95006728. Source: OSTI; NTIS; INIS; GPO Dep.

Following a brief review of the limitations of a popular technique for modeling the soil action in analyses of the dynamic response of deeply embedded cylindrical foundations and structures, the sources of the limitations are identified and a modification is proposed which, while retaining the attractiveness of the original model, defines correctly the action of the system. In the proposed approach, the soil medium is modeled by a series of elastically constrained, rather than unconstrained, thin horizontal layers with a circular hole at the center. The impedances of the constrained layers are established and are then used to evaluate the dynamic

response of a rigid vertical cylinder embedded in a uniform viscoelastic stratum of constant thickness and infinite extent in the horizontal direction. The cylinder and the stratum are presumed to be supported on a non-deformable base undergoing a uniform horizontal motion. The effects of both harmonic and earthquake induced ground motions are considered. The response quantities examined include the dynamic force per unit of cylinder height and the corresponding base shear and base moment. The system investigated simulates the design of underground storage tanks at Hanford for the storage of radioactive wastes.

8226 (DOE/EA–0931) **Center for Molecular Electronics, University of Missouri, St. Louis. Environmental Assessment.** USDOE, Washington, DC (United States). Jun 1994. 33p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95002675. Source: OSTI; NTIS; GPO Dep.

The Department of Energy (DOE) proposes to authorize the University of Missouri, St. Louis to proceed with the detailed design and construction of the proposed Center for Molecular Electronics. The proposed Center would consist of laboratories and offices housed in a three-story building on the University campus. The proposed modular laboratories would be adaptable for research activities principally related to physics, chemistry, and electrical engineering. Proposed research would include the development and application of thin-film materials, semi-conductors, electronic sensors and devices, and high-performance polymers. Specific research for the proposed Center has not yet been formulated, therefore, specific procedures for any particular process or study cannot be described at this time. The proposed construction site is an uncontaminated panel of land located on the University campus. This report contains information about the environmental assessment that was performed in accordance with this project.

8227 (EPD-CTG–94-0037) **Nuclear criticality safety evaluation – DWPF Late Wash Facility, Salt Process Cell and Chemical Process Cell.** Williamson, T.G. Westinghouse Savannah River Co., Aiken, SC (United States). 17 Oct 1994. 40p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE95004805. Source: OSTI; NTIS; INIS; GPO Dep.

The Savannah River Site (SRS) High Level Nuclear Waste will be vitrified in the Defense Waste Processing Facility (DWPF) for long term storage and disposal. This is a nuclear criticality safety evaluation for the Late Wash Facility (LWF), the Salt Processing Cell (SPC) and the Chemical Processing Cell (CPC). of the DWPF. Waste salt solution is processed in the Tank Farm In-Tank Precipitation (ITP) process and is then further washed in the DWPF Late Wash Facility (LWF) before it is fed to the DWPF Salt Processing Cell. In the Salt Processing Cell the precipitate slurry is processed in the Precipitate Reactor (PR) and the resultant Precipitate Hydrolysis Aqueous (PHA) produce is combined with the sludge feed and frit in the DWPF Chemical Process Cell to produce a melter feed. The waste is finally immobilized in the Melt Cell. Material in the Tank Farm and the ITP and Extended Sludge processes have been shown to be safe against a nuclear criticality by others. The precipitate slurry feed from ITP and the first six batches of sludge feed are safe against a nuclear criticality and this evaluation demonstrates that the processes in the LWF, the SPC and the CPC do not alter the characteristics of the materials to compromise safety.

8228 (FRCEA-TH–409) **Interactive three dimensional simulation for generation of synthetical returns in remote handling assisted by computer.** Even, P. CEA Centre d'Etudes de Fontenay-aux-Roses, 92 (France); Rennes-1 Univ., 35 (France). 19 Oct 1989. 260p. (In French). Order Number DE95612718. Source: OSTI; NTIS (US Sales Only); INIS.

The general theme of this thesis concerns the creation of concepts and methods using the interactive vision by computer to improve a system of remote handling assisted by computer.

8229 (IAEA-TECDOC–769, pp. 69-80) **Application of artificial neural networks for modeling localized corrosion.** Ben-Haim, M. (Israel Atomic Energy Commission, Beersheba (Israel). Nuclear Research Center-Negev); Marelly, M. International Atomic Energy Agency, Vienna (Austria). Oct 1994. (CONF-9310404–: Specialists meeting on current practices and future trends in expert system developments for use in the nuclear industry, Tel Aviv (Israel), 11-15 Oct 1993). In *Current practices and future trends in expert system developments for use in the nuclear industry. Report of a specialists meeting held in Tel Aviv, Israel, 11-15 October 1993.* 147p. Order Number DE95615814. Source: OSTI; NTIS (US Sales Only); INIS.

Artificial neural networks (ANN) were applied to modeling localized corrosion of Incoloy Alloy 825 in simulated J - 13 well water. ANN as a non linear models can represent accurately localized corrosion phenomena caused by an environment containing chlorides, nitrates, fluorides and sulfates at various temperature ranges. Although the nature of the dependent variable of the ANN models, the visual rating of the localized corrosion is qualitative, a good correspondence between the output of the model and the actual indications is determined. Accurate ANN modeling has been carried out by using the visual inspection of the specimen surface, in contrast to linear modeling where in order to get a sound correlation between the system variables, a complex dependent parameter, having no clear physical meaning has been chosen. It has also been found that one can extrapolate to a certain extent, beyond the ability to interpolate (as with linear models). The ANN model predicted with a low relative error the visual rating of the corrosion rate of records which where part of the testing set of the ANN and belonging to the original full factorial design experiment. Thus, such models can be used for detailed analysis procedures as sensitivity, knowledge acquisition and optimization. (author). 7 refs, 9 figs.

8230 (KAERI/RR–1236/92) **The development of advanced robotics for the nuclear industry.** Kim, Seung Ho (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Lee, Jong Min; Kim, Chang Hoi; Kim, Byung Soo; Sohn, Surg Won; Hwoang, Suk Yeoung; Lee, Yong Bum; Kim, Woong Ki; Kim, Tae Ryong; Jung, Seung Ho; Park, Jin Seok; Hwoang, Chang KyueKorea Cancer Center Hospital, Seoul (Korea, Republic of). May 1992. 88p. (In Korean). Order Number DE95612681. Source: OSTI; NTIS; INIS.

This project started in september '92 and will be carried out for three and a half years as its first phase. The two major work scopes of this project consist of developing robotic system for nuclear power plants and developing advanced robotic technology. Conceptual design has been carried out and detailed specifications have been fixed through tremendous data reviewing for a multifunctional robot system. A mobile robot system for inspection and maintenance in nuclear power plants is designed in a modular type to modify easily in the field. Articulated manipulator of 3 degrees of freedom is designed to do the light work in the local work area away from the control station. The design of manipulator has been realized to operate with the 24V battery power. Various aspects of study are performed regarding the development of nozzle dam installation robot. And finally force reflecting master/slave control technique are studied. The-state-of-the-art for vision system applied to robot system is investigated. Stereo vision system has been constructed to enhance efficiency as well as safety when remote manipulation is needed. In order to develop inspection and survey system, object recognition and infrared image observation technique has been studied. Object recongnition system and IR image observation system has been constructed in the hardware. (Author).

8231 (KAERI/RR–1256/93) **Development of laser technology (Development of the wavelength tuning and the output stabilization technology).** Lee, Jong Min (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Cha, Hyung Ki; Kim, Sung Ho; Cha, Byung Hun; Rhee, Yong Joo; Lim, Chang Hwan; Yoo, Byung Duk; Song, Kyu Seok; Choe, An Seong; Baik, Dae Hyun; Kim, Jung Bog; Jeong, Do Young; Jung,Korea Cancer Center Hospital, Seoul (Korea, Republic of). Dec 1992. 132p. (In Korean). Order Number DE95612682. Source: OSTI; NTIS; INIS.

Various types of the dye laser are developed and investigated for the wavelength tuning and the output stabilization. And a Ti:sapphire laser system was developed to expand the lasing frequency and the injection seeding was executed in this Ti:sapphire laser. New frequency tuning mechanism using a wedge prism was developed and it was proved that better fine frequency tuning can be achieved by rotating the wedge prism instead of the tuning mirror. Efficiency and the parameters of the high power dye laser

amplifier system were calculated by the computer simulation. The characteristics of the dye nozzle were examined for the stabilization of the high power, high repetition rate dye laser system and the output characteristics of the dye laser using the nozzle are investigated. (Author).

8232 (KAERI/RR–1271/94) **Development of high power free-electron lasers.** Lee, Jong Min (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Nam, Chang Hee; Lee, Byeong Cheol; Kim, Seon Kook; Jeong, Yeong Uk; Cho, Seong Oh; Choi, Byeong Ho; Choi, Hwa Rim. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jan 1994. 287p. (In Korean). Order Number DE95612683. Source: OSTI; NTIS; INIS.

A millimeter wave free-electron laser driven by electrostatic accelerator has been constructed, and simulation codes were developed. Main components such as high current electron gun, power supply for electron gun, electrostatic accelerator, permanent-magnet undulator and millimeter-wave cavity have been developed. Simulation codes calculating the output power and trajectory of electron beam in undulator have been developed. The energy of the electron beam is 430 keV and the output wavelength is 3-10 mm. (Author).

8233 (KAERI/RR–1312/94) **Development of 200 W class Nd:YAG laser with unstable resonator.** Kim, Jeong Moog (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Kim, Cheol Jung; Cho, Jae Wan; Kim, Kwang Suk; Park, Seung Kyu; Lee, Soo Ho. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jul 1994. 58p. (In Korean). Order Number DE95612685. Source: OSTI; NTIS; INIS.

We developed a 200 W Class Nd:YAG laser with unstable resonator. We investigated the operational characteristics of laser with positive branch unstable resonator and analyzed the influence of laser parameters on the laser materials processing. Also, we designed and fabricated laser power supply for the modulated cw Nd:YAG laser and then measured the output parameters of this laser. To accelerate the commercialization by the joint company, the training and transfer of technology were pursued in the joint participation by company researchers from the early stage. (Author).

8234 (KAERI/RR–1337/93) **The development of optimal design technology in robotics -The development of advanced robotics for the nuclear industry-.** Kim, Tae Ryong (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Jung, Seung Ho; Park, Jin Ho; Park, Jin Seok. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jul 1994. 203p. (In Korean). Order Number DE95612686. Source: OSTI; NTIS; INIS.

A document for the nozzle dam design requirement (DR) was prepared, which can be applied to the domestic nuclear power plant. The general requirement and technical requirements for the loading conditions, material specification, radiation dose limit, etc. were clearly stated in the DR. KAERI designed nozzle dam mock-up (central section and two side section) was fabricated with the carbon fabric reinforced plastic (CFRP) which shows relatively high specific modulus and specific strength. The ratio of nozzle dam stiffness to weight was remarkably improved from 18.25×10^3 N m^2/kg (KORI nozzle dam) to 29.83×10^3 N m^2/kg (KAERI nozzle dam). And the structure integrity of KAERI nozzle dam was verified through the stress analysis using ANSYS program. Proper actuator and mechanism of the gripper to handle the nozzle dam were selected in order to obtain high gripping force by the optimal design of the link length to the gripping force ratio. The structural integrity of main link, sub-link, middle link, and main shaft of gripper were also verified. For the conceptual design of an electric robot manipulator to handle the nozzle dam, the driving torque required to move the payload (here nozzle dam: 20 kg) and the structural deadweight were computed at each joint of manipulator links. The preliminary structure integrity of manipulator under the loading conditions during the nozzle dam operation was also verified. For the development of a robot controller using personal computer, the computer operational system to be used was studied. (Author).

8235 (KAERI/RR–1350/93) **The development of advanced robotic technology -The development of advanced robotics for the nuclear industry-.** Lee, Jong Min (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Lee, Yong Bum; Kim, Woong Ki; Park, Soon Yong; Kim, Seung Ho; Kim, Chang Hoi; Hwang, Suk Yeoung; Kim, Byung Soo; Lee, Young Kwang. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jul 1994. 250p. (In Korean). Order Number DE95612687. Source: OSTI; NTIS; INIS.

In this year (the second year of this project), researches and development have been carried out to establish the essential key technologies applied to robot system for nuclear industry. In the area of robot vision, in order to construct stereo vision system necessary to tele-operation, stereo image acquisition camera module and stereo image displayer have been developed. Stereo matching and storing programs have been developed to analyse stereo images. According to the result of tele-operation experiment, operation efficiency has been enhanced about 20% by using the stereo vision system. In a part of object recognition, a tele-operated robot system has been constructed to evaluate the performance of the stereo vision system and to develop the vision algorithm to automate nozzle dam operation. A nuclear fuel rod character recognition system has been developed by using neural network. As a result of perfomance evaluation of the recognition system, 99% recognition rate has been achieved. In the area of sensing and intelligent control, temperature distribution has been measured by using the analysis of thermal image histogram and the inspection algorithm has been developed to determine of the state be normal or abnormal, and the fuzzy controller has been developed to control the compact mobile robot designed for path moving on block-typed path. (Author).

8236 (KAERI/RR–1359/93) **The development of robotic system for the nuclear power plants -The development of advanced robotics for the nuclear industry-.** Kim, Seung Ho (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Kim, Chang Hoi; Kim, Byung Soo; Lee, Yong Bum; Hwang, Suk Yeoung; Kim, Woong Ki; Park, Soon Yong; Lee, Young Kwang; Lee, Jae Gyeong; Seo, Yong Chil. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jul 1994. 493p. (In Korean). Order Number DE95615810. Source: OSTI; NTIS; INIS.

The omni-directional planetary wheel type mobile robot (KAEROT/ml) has been developed on the concepts of the modularity, reliability, and stability. Manipulator system is designed in order to be able to install on mobile system and to upgrade operating capability. Control system consists of 68030 processor board, servo motor controller and I/O board. The 6 DOFs hydraulic manipulator is designed for nozzle dam installation and removal. The reachable length of manipulator is 1.7 m with the wrist configuration of pitch-yaw-roll. For the easy installation of manipulator from outside steam generator, specially designed guider is considered. Also master manipulator is designed for force feedback control. RCP (Remote Control Part) is constructed with Sparc processor boards and servo control boards. Graphic simulation has done for the evaluation of manipulator performance of nozzle dam works. (Author).

8237 (KE–93017G) **Study on energy efficiency standard for clothes washers and promoting the spread of high efficiency motors.** Shin, D.Y. (Korea Institute of Energy Research, Taejon (Korea, Republic of)); Lee, W.Y.; Lee, S.K.; Han, S.B.; Lee, B.D. No corporate text available. Dec 1993. 152p. (In Korean). Order Number DE95744287. Source: OSTI; NTIS (US Sales Only).

The objective of this study is to set the energy efficiency standards and to grade clothes washers and to plan the pomoting method for more spreading high efficiency electric motors. (author). refs., figs., tabs.

8238 (LA–12831-MS) **Calibration of neutron moisture gauges and their ability to spatially determine soil water content in environmental studies.** Nyhan, J.W.; Martinez, J.L.; Langhorst, G.J. Los Alamos National Lab., NM (United States). Oct 1994. 141p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. Order Number DE95006074. Source: OSTI; NTIS; INIS; GPO Dep.

Several neutron moisture gauges were calibrated, and their ability to spatially determine soil water content was evaluated. In 1982, the midpoint of sensitivity of each neutron probe to the detection of hydrogen was determined, as well as the radius of investigation of each probe in crushed Bandelier Tuff with varying water contents. After determining the response of one of the moisture gauges to changes in soil water at the soil-air interface, a neutron transport

model was successfully calibrated to predict spatial variations in soil water content. The model was then used to predict various shapes and volumes of crushed Bandelier Tuff interrogated by the neutron moisture gauge. From 1991 through 1994, six neutron moisture gauges were calibrated for soil water determinations in a local topsoil and crushed Bandelier Tuff, as well as for a sample of fine sand and soils from a field experiment at Hill Air Force Base. Statistical analysis of the calibration results is presented and summarized, and a final summary of practical implications for future neutron moisture gauge studies at Los Alamos is included.

8239 (NEI-DK–1795, pp. 101-107) **Experience gained in the lightning protection of aircraft and petrochemical installations applicable to wind turbine generators.** Baldwin, R.E. (AEA Lightning Centre, Culham, Abingdon, Oxfordshire (United Kingdom)). Danmarks Tekniske Univ., Lyngby (Denmark). Afd. for Fluid Mekanik. 1994. (CONF-9403191–: 26. Meeting of experts on lightning protection of wind turbine generator systems and EMC problems in the associated control systems, Cologno Monzese (Italy), 8-9 Mar 1994). In *Lightning protection of wind turbine generator systems and EMC problems in the associated control systems.* 164p. Order Number DE95737572. Source: OSTI; NTIS.

The nature of lightning was discussed and the method used in the aircraft industry to gain adequate protection. Direct effects (damage) and some aircraft test specifications are presented in Appendix A. Indirect effects (electrical interference) and methods of avoiding problems of induced voltages are presented in Appendix B for aircraft, and Appendix C for ground installations. The main text deals with aspects of the protection of wind turbine generators using read across from aircraft and petro-chemical complex protection. (au)

8240 (NEI-DK–1795, pp. 139-148) **Lightning protection of the Fokker 100 CFRP rudder.** Ruiter, A.J.M. (Fokker Space and Systems V.V., Amsterdam (Netherlands)). Danmarks Tekniske Univ., Lyngby (Denmark). Afd. for Fluid Mekanik. 1994. (CONF-9403191–: 26. Meeting of experts on lightning protection of wind turbine generator systems and EMC problems in the associated control systems, Cologno Monzese (Italy), 8-9 Mar 1994). In *Lightning protection of wind turbine generator systems and EMC problems in the associated control systems.* 164p. Order Number DE95737572. Source: OSTI; NTIS.

This paper describes the construction of the structural parts of the Fokker 100 CFRP rudder with respect to the requirements for electrical bonding and lightning protection. Furthermore the philosophy for the selection of a consumable trailing edge is given. A description of possible alternative designs for trailing edges and their advantages and disadvantages with respect to damage after lightning impact will also be reviewed. An overview of the tests performed on test samples and the rudder construction will be presented and discussed. The effectiveness of both the selected structural provisions and trailing edge will be described (and proven) by reporting the results of the simulated lightning tests performed at the High Voltage Laboratory of the N.V.KEMA, Arnhem, Holland. Proof will be presented that the trailing edge construction and its bonding through the structural parts of the rudder to the main aircraft structure is a solution which results in minor damage to the rudder after lightning impact. Furthermore it will be shown that the selected trailing edge construction is less favoured by the structural designers due to the weight penalty. (au)

8241 **Autonomous mobile robot for radiologic surveys.** Dudar, A.M.; Wagner, D.G.; Teese, G.D. 1992. Filed date 27 Oct 1992. U.S. Patent Application 7-966,925. 27p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95006139. Source: OSTI; NTIS (US Sales Only); GPO Dep.

This invention is comprised of an apparatus for conducting radiologic surveys. The apparatus comprises in the main a robot capable of following a preprogrammed path through an area, a radiation monitor adapted to receive input from a radiation detector assembly, ultrasonic transducers for navigation and collision avoidance, and an on-board computer system including an integrator for interfacing the radiation monitor and the robot. The robot may be equipped with memory for the collection and storage of radiation survey information. The on-board computer system is connected to a remote host computer via a UHF radio link. The apparatus is powered by a rechargeable 24-volt DC battery, and is stored at a docking station when not in use and/or for recharging. A remote host computer contains a stored database defining paths between points in the area where the robot is to operate, including but not limited to the locations of walls, doors, stationary furniture and equipment, and sonic markers if used. When a program consisting of a series of paths is downloaded to the on-board computer system, the robot conducts a floor survey autonomously at any preselected rate. When the radiation monitor detects contamination, the robot resurveys the area at reduced speed and resumes its preprogrammed path if the contamination is not confirmed. If the contamination is confirmed, the robot stops and sounds an alarm.

8242 **Apparatus for restraining and transporting dies.** Allison, J.W.; La Barre, T.L. To Dept. of Energy. 1992. Filed date 2 Sep 1992. U.S. Patent Application 7-970,882. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC11-76PN00014. Order Number DE95006111. Source: OSTI; NTIS (US Sales Only); GPO Dep.

This invention relates to an apparatus for restraining and transporting dies in punch press operations, especially an apparatus including a hydraulic restraining fixture and a flotation platen which allows ease of release and movement of dies from one work station to another, with minimum work. The air flotation platen operates at 5-10 psi, and the hydraulically operated die restraining fixture holds the die and platen in place during the compacting in a punch press; the die and platen can be released easily after compacting.

8243 **Lightweight extendable and retractable pole.** Warren, J.L.; Brandt, J.E. 1992. Filed date 2 Dec 1992. U.S. Patent Application 7-984,598. 37p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC08-88NV10617. Order Number DE95006119. Source: OSTI; NTIS (US Sales Only); GPO Dep.

A lightweight extendable and retractable telescopic pole is disclosed comprising a plurality of non-metallic telescoping cylinders with sliding and sealing surfaces between the cylinders, a first plug member on the upper end of the smallest cylinder, and a second plug member on the lower end of the largest cylinder, whereby fluid pressure admitted to the largest cylinder will cause the telescoping cylinders to slide relative to one another causing the pole to extend. An elastomeric member connects the first plug member with one of the intermediate cylinders to urge the cylinders back into a collapsed position when the fluid pressure in the cylinders is vented. Annular elastomer means are provided which seal one cylinder to another when the pole is fully extended and further serve to provide a cushion to prevent damage to the cylinders when the pole is urged back into its retractable position by the elastomeric means and the venting of the pressure. Valve means associated with the pole are provided to admit a fluid under pressure to the interior of the telescoping cylinders the pole while pressurizing a pressure relief port having an opening larger than the inlet port in a closed position whereby removal of the pressure on the relief port will cause the relief port to open to quickly lower the pressure in the interior of the telescoping cylinders to thereby assist in the rapid retraction of the extended pole.

8244 (PNL-SA–24072) **A redundant, 6-DOF parallel manipulator structure with improved workspace and dexterity.** Stoughton, R.S. (Pacific Northwest Lab., Richland, WA (United States)); Salerno, R.; Canfield, S.; Reinholtz, C. Pacific Northwest Lab., Richland, WA (United States). Aug 1994. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-940859–29: 5. international symposium on robotics and manufacturing, Maui, HI (United States), 14-18 Aug 1994). Order Number DE95004898. Source: OSTI; NTIS; INIS; GPO Dep.

This paper presents a novel manipulator structure which combines two known parallel manipulator structures–a Stewart Platform (SP), and a double octahedral Variable Geometry Truss (VGT). The combined VGT + SP structure is redundant, using nine actuators to realize six-DOF motion. Combining the two structures allows the translational and orientational workspaces of the two individual structures to sum together to a much larger workspace than is generally achievable with parallel manipulator structures. In addition, the VGT portion of the structure allows the configuration of the Stewart Platform to be changed "on the fly" from one with a

large workspace to one with high dexterity. A useful application of this structure is at the distal end of a truss-based manipulator, where it can serve as a dexterous wrist while preserving an internal passageway for cabling and/or conveyance systems.

8245 (WHC-SD-SQA-CSA–20381) **CSER 94-014: Storage of metal-fuel loaded EBR-II casks in concrete vault on PFP grounds.** Hess, A.L. Westinghouse Hanford Co., Richland, WA (United States). 5 Dec 1994. 23p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95004750. Source: OSTI; NTIS; INIS; GPO Dep.

A criticality safety evaluation is presented to permit EBR-2 spent fuel casks loaded with metallic fuel rods to be stored in an 8-ft diameter, cylindrical concrete vault inside the PFP security perimeter. The specific transfer of three casks with Pu alloy fuel from the Los Alamos Molten Plutonium Reactor Experiment from the burial grounds to the vault is thus covered. Up to seven casks may be emplaced in the casing with 30 inches center to center spacing. Criticality safety is assured by definitive packaging rules which keep the fissile medium dry and at a low effective volumetric density.

8246 (WHC-SD-SQA-CSA–20384) **Addendum 3 to CSAR 80-027, Use of calorimeter 109B for fissile material measurement.** Chiao, T. Westinghouse Hanford Co., Richland, WA (United States). 5 Dec 1994. 50p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95004491. Source: OSTI; NTIS; INIS; GPO Dep.

This modification to the Plutonium Finishing Plant (PFP) calorimeter system involves removing current calorimeter No. 3 from the water bath and replacing it with a calorimeter that can accommodate larger diameter items (an oversize can). The inside diameters of both the sample and the reference cells will be increased to 5.835 inches at the top opening and to 5.22 inches at the bottom, the 8 inch high measurement zone. This Addendum 3 to Criticality Safety Analysis Report 80-027 examines criticality safety during the use of the modified calorimeter (Calorimeter 109B) with enlarged cell tube diameters to assure that an adequate margin of subcriticality is maintained for all normal and contingency conditions.

8247 (WHC-SD-WM-OTP–170) **Test plan for a U.S. Department of Transportation Specification 7A Type A radioactive material packaging, WHC Liquid Sample Package (unshielded) (3M SafeSend® Reusable Super Pack Shipping System [SP-R1L Kit]).** Kelly, D.L. Westinghouse Hanford Co., Richland, WA (United States). 13 Jan 1995. 144p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95005980. Source: OSTI; NTIS; INIS; GPO Dep.

The objective of this Test Plan is to describe the testing for certification of the 3M SafeSend container (SP-R1L, unshielded) as a US Department of Transportation Specification 7A Type A (DOT-7A) liquid package. The SafeSend SP-R1L is manufactured by the 3M Company and designed to be reusable up to eight times. The contents of the test units will be a polyethylene-coated glass bottle filled with carbon steel shot and water to simulate a liquid with a specific gravity of 2. The SafeSend SP-R1L, unshielded container, will consist of the "as-manufacture" package with a payload being a 1-liter (32-oz), polycoated, wide-mouth glass bottle with a Teflon-lined phenolic lid, and filled with the simulated contents as stated above. The packaging also includes six foam spacers and a cardboard shipper. Testing was conducted in September 1994. The packagings being tested are also intended for use in air transportation.

8248 (WHC-SD-WM-OTR–170) **Test and evaluation report, U.S. Department of Transportation Specification 7A Type A radioactive material packaging, WHC Solid Sample Package (unshielded) (3M SafeSend® Reusable Super Pack Shipping System [SP-R1L Kit]).** Kelly, D.L. Westinghouse Hanford Co., Richland, WA (United States). 18 Jan 1995. 92p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95005986. Source: OSTI; NTIS; INIS; GPO Dep.

This report documents the US Department of Transportation Specification 7A Type A (DOT-7A) compliance test results of the Westinghouse Hanford Company Solid Sample Package, unshielded version. Testing was conducted on two packaging configurations in September 1994. The packagings tested were originally intended to be qualified for transporting liquids having a specific gravity of 2. However, during the 9-m (30-ft) drop tests, the internal polycoated glass bottle either broke or cracked when the packaging impacted the test pad. Therefore, the packaging configurations, as described herein, may be used in transporting solids but not liquids. The packaging configurations described may be transported by air, and meet the applicable International Air Transport Association/International Divil Aviation Organization (IATA/ICAO), Dangerous Goods Regulations, in addition to the DOT-7A requirements.

4204 Heat Transfer and Fluid Flow

Refer also to citation(s) 7184, 7427, 7663, 7690, 8022, 8267

8249 (DOE/CE/26592–2) **Development of advanced low-temperature heat transfer fluids for district heating and cooling, final report.** Cho, Y.I.; Lorsch, H.G. Drexel Univ., Philadelphia, PA (United States). 31 Mar 1991. 28p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG01-89CE26592. Order Number DE95004709. Source: OSTI; NTIS; GPO Dep.

The feasibility of adding phase change materials (PCMS) and surfactants to the heat transfer fluids in district cooling systems was investigated. It increases the thermal capacity of the heat transfer fluid and therefore decreases the volume that needs to be pumped. It also increases the heat transfer rate, resulting in smaller heat exchangers. The thermal behavior of two potential PCMS, hexadecane and tetradecane paraffin wax, was experimentally evaluated. The heat of fusion of these materials is approximately 60% of that of ice. They exhibit no supercooling and are stable under repeated thermal cycling. While test results for laboratory grade materials showed good agreement with data in the literature, both melting point and heat of fusion for commercial grade hexadecane were found to be considerably lower than literature values. PCM/water mixtures were tested in a laboratory-scale test loop to determine heat transfer and flow resistance properties. For 10% and 25% PCM/water slurries, the heat transfer enhancement was found to be approximately 18 and 30 percent above the value for water, respectively. Within the turbulent region, there is only a minor pumping penalty from the addition of up to 25% PCM to the water. Research is continuing on these fluids in order to determine their behavior in large-size loops and to arrive at optimum formulations.

8250 (DOE/ER/40878–T1) **Cryogenic helium gas convection research.** Donnelly, R.J. (ed.). Oregon Univ., Eugene, OR (United States). Dept. of Physics. Oct 1994. 202p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG05-94ER40878. Order Number DE95004372. Source: OSTI; NTIS; INIS; GPO Dep.

This is a report prepared by a group interested in doing research in thermal convection using the large scale refrigeration facilities available at the SSC Laboratories (SSCL). The group preparing this report consists of Michael McAshan at SSCL, Robert Behringer at Duke University, Katepalli Sreenivasan at Yale University, Xiao-Zhong Wu at Northern Illinois University and Russell Donnelly at the University of Oregon, who served as Editor for this report. This study reports the research and development opportunities in such a project, the technical requirements and feasibility of its construction and operation, and the costs associated with the needed facilities and support activities. The facility will be a unique national resource for studies of high-Reynolds-number and high-Rayleigh-number and high Rayleigh number turbulence phenomena, and is one of the six items determined as suitable for potential funding through a screening of Expressions of Interest. The proposed facility is possible only because of the advanced cryogenic technology available at the SSCL. Typical scientific issues to be addressed in the facility will be discussed. It devolved during our study, that while the main experiment is still considered to be the thermal convection experiment discussed in our original Expression of Interest, there are now a very substantial set of other, important and fundamental experiments which can be done with the large cryostat proposed for the convection experiment. We believe the facility

could provide several decades of front-line research in turbulence, and shall describe why this is so.

8251 (FRCEA-TH–411) **Finite elements volumes methods: applications to the Navier-Stokes equations and convergence results.** Emonot, P. CEA Centre d'Etudes de Grenoble, 38 (France). Dept. de Thermohydraulique et de Physique; Lyon-1 Univ., 69 - Villeurbanne (France). 3 Dec 1992. 110p. (In French). Order Number DE95612667. Source: OSTI; NTIS (US Sales Only); INIS.

In the first chapter are described the equations modeling incompressible fluid flow and a quick presentation of finite volumes method. The second chapter is an introduction to the finite elements volumes method. The box model is described and a method adapted to Navier-Stokes problems is proposed. The third chapter shows a fault analysis of the finite elements volumes method for the Laplacian problem and some examples in one, two, three dimensional calculations. The fourth chapter is an extension of the error analysis of the method for the Navier-Stokes problem.

8252 (KAERI/RR–1206/92) **Development of high pressure two-phase choked flow analysis methodology in complex piping system.** Yoo, Geun Jong (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Sim, Yoon Sub; Chung, Chang Kyu; Lee, Jun. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Dec 1992. 97p. (In Korean). Order Number DE95612668. Source: OSTI; NTIS; INIS.

Choked flow mechanism, characteristics of two-phase flow sound velocity and compressibility effects on flow through various piping system components are studied to develop analysis methodology for high pressure two-phase choked flow in complex piping system which allows choking flow rate evaluation and piping system design related analysis. Piping flow can be said choked if Mach number is equal to 1 and compressibility effects can be accounted through modified incompressible formula in momentum equation. Based on these findings, overall analysis system is developed to study thermal-hydraulic effects on steady-state piping system flow and future research items are presented. (Author).

8253 (NEI-NO–468) **Experimental investigation of an equilibrium boundary layer in strong adverse pressure gradient.** Skaare, P.E. Trondheim Univ. (Norway). Norges Tekniske Hoegskole. 1994. 189p. Order Number DE95737635. Source: OSTI; NTIS.

The experimental results for an equilibrium type boundary layer in a strong adverse pressure gradient flow are reported. The measurements show that similarity in the mean flow and the turbulent stresses has been achieved over a substantial streamwise distance where the skin friction coefficient is kept at a low, constant level. Although the Reynolds stress distribution across the layer is entirely different from the flow at zero pressure gradient, the ratios between the different turbulent stress components were found to be similar, showing that the mechanism for distributing the turbulent energy between the different components remains unaffected by the mean flow pressure gradient. Close to the surface the gradient of the mixing length was found to increase from 0.41 to 0.78. This is almost twice as high as for the zero pressure gradient case. The multi-point measurements indicated strong effects of the pressure gradient on the turbulent structure of the boundary layer. The average inclination from the wall in the (x, y) plane was found to be much more constant (about 20 degrees) through the layer than in the zero pressure gradient case. The length scales associated with the two-point correlations of the velocity fluctuations increased much faster with respect to the distance from the wall. In the bulk part of the layer the length scales were comparable to the length scales found in the zero pressure gradient layer, except for the streamwise length scale of the two-point correlation which was approximately half the length. Similarity in the triple correlation was also found to be good. The correlations show that there is a considerable diffusion of turbulent energy from the central part of the boundary layer towards the wall. The diffusion mechanism is caused by a second peak in the turbulence production, located at y/δ to be about 0.45. This production was for the present case almost as strong as the production found near the wall.

8254 (NEI-NO–473) **Dynamic simulation of the liquefaction section in baseload LNG plants.** Melaaen, E. Trondheim Univ. (Norway). Norges Tekniske Hoegskole. Oct 1994. 163p. Order Number DE95744875. Source: OSTI; NTIS.

The thesis demonstrates modelling and simulation of a cryogenic heat exchanger in a baseload LNG plant within two main areas. The first one concerns the development and description of the transient liquefaction models. The second one looks at the verification and studies the process dynamics. Three transient models, model A, B and C, were developed. Models A and B were simplified models based on the energy balance, with model B additionally considering an accumulation of liquid in separator drums. Model C was a complete model which also handled accumulation of mass and momentum in heat exchangers and drums. Each unit in the plant was modeled separately and linked in a process flow sheet. The greatest challenge during design of the simulation system was to model the coil-wound heat exchanger. A strong coupling between the variables and the nonlinear equations led to converge problems in certain cases. The equation system was particularly sensitive in the region where the fluid was on the border of single and two-phase flow. A model of the digital control system was implemented, and start-up, shutdown, steady-state operation and change over in the production capacity were described. Simulation of these different operation models were performed, and particular effects due to changes in control parameters or input variables such as pressure, temperature, flow rate and compositions, were discussed. Small alteration of these parameters caused displacement in the heat-exchanger load, and prevented the process from running optimal. As a result, the process could not manage to produce the specified LNG-quantity. Consequences could also be fluctuation in the tube-wall temperature, which might eventually destroy the equipment through material stress. 72 refs., 48 figs., 30 tabs.

8255 (SAND–94-1402C) **A domain decomposition study of massively parallel computing in compressible gas dynamics.** Wong, C.C. (Sandia National Labs., Albuquerque, NM (United States)); Blottner, F.G.; Payne, J.L.; Soetrisno, M. Sandia National Labs., Albuquerque, NM (United States). [1995]. 16p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. (CONF-950130–4: 33. American Institute of Aeronautics and Astronautics (AIAA) aerospace sciences meeting, Reno, NV (United States), 9-12 Jan 1995). Order Number DE95004759. Source: OSTI; NTIS; GPO Dep.

The appropriate utilization of massively parallel computers for solving the Navier-Stokes equations is investigated and determined from an engineering perspective. The issues investigated are: (1) Should strip or patch domain decomposition of the spatial mesh be used to reduce computer time? (2) How many computer nodes should be used for a problem with a given sized mesh to reduce computer time? (3) Is the convergence of the Navier-Stokes solution procedure (LU-SGS) adversely influenced by the domain decomposition approach? The results of the paper show that the present Navier-Stokes solution technique has good performance on a massively parallel computer for transient flow problems. For steady-state problems with a large number of mesh cells, the solution procedure will require significant computer time due to an increased number of iterations to achieve a converged solution. There is an optimum number of computer nodes to use for a problem with a given global mesh size.

8256 (SAND–94-1403C) **Implementation of a parallel algorithm for thermo-chemical nonequilibrium flow simulations.** Wong, C.C. (Sandia National Labs., Albuquerque, NM (United States)); Blottner, F.G.; Payne, J.L.; Soetrisno, M. Sandia National Labs., Albuquerque, NM (United States). [1995]. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. (CONF-950130–2: 33. American Institute of Aeronautics and Astronautics (AIAA) aerospace sciences meeting, Reno, NV (United States), 9-12 Jan 1995). Order Number DE95004758. Source: OSTI; NTIS; GPO Dep.

Massively parallel (MP) computing is considered to be the future direction of high performance computing. When engineers apply this new MP computing technology to solve large-scale problems, one major interest is what is the maximum problem size that a MP

computer can handle. To determine the maximum size, it is important to address the code scalability issue. Scalability implies whether the code can provide an increase in performance proportional to an increase in problem size. If the size of the problem increases, by utilizing more computer nodes, the ideal elapsed time to simulate a problem should not increase much. Hence one important task in the development of the MP computing technology is to ensure scalability. A scalable code is an efficient code. In order to obtain good scaled performance, it is necessary to first have the code optimized for a single node performance before proceeding to a large-scale simulation with a large number of computer nodes. This paper will discuss the implementation of a massively parallel computing strategy and the process of optimization to improve the scaled performance. Specifically, we will look at domain decomposition, resource management in the code, communication overhead, and problem mapping. By incorporating these improvements and adopting an efficient MP computing strategy, an efficiency of about 85% and 96%, respectively, has been achieved using 64 nodes on MP computers for both perfect gas and chemically reactive gas problems. A comparison of the performance between MP computers and a vectorized computer, such as Cray-YMP, will also be presented.

8257 (SAND–94-2064C) **Silicon heat pipes for cooling electronics.** Adkins, D.R.; Shen, D.S.; Palmer, D.W.; Tuck, M.R. Sandia National Labs., Albuquerque, NM (United States). [1994]. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. (CONF-9411166–1: 1. annual spacecraft thermal control symposium, Albuquerque, NM (United States), 16-18 Nov 1994). Order Number DE95004553. Source: OSTI; NTIS; GPO Dep.

The increasing power density of integrated circuits (ICs) is creating the need for improvements in systems for transferring heat away from the chip. In earlier investigations, diamond films were used to conduct heat from ICs and spread the energy across a heat sink. The authors' investigation has indicated that a 635 μm (25 mil) thick silicon substrate with embedded heat pipes could perform this task better than a diamond film. From their study, it appears that the development of a heat-pipe heat-spreading system is both technically and commercially feasible. The major challenge for this heat-spreading system is to develop an effective wick structure to transport liquid to the heated area beneath the chip. This paper discusses the crucial design parameters for this heat-pipe system, such as the required wick properties, the material compatibility issues, and the thermal characteristics of the system. The paper also provides results from some recent experimental activities at Sandia to develop these heat-pipe heat spreader systems.

8258 (SAND–94-3190C) **Verification of computational aerodynamic predictions for complex hypersonic vehicles using the INCA™ code.** Payne, J.L.; Walker, M.A. Sandia National Labs., Albuquerque, NM (United States). [1995]. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. (CONF-950130–3: 33. American Institute of Aeronautics and Astronautics (AIAA) aerospace sciences meeting, Reno, NV (United States), 9-12 Jan 1995). Order Number DE95004757. Source: OSTI; NTIS; GPO Dep.

This paper describes a process of combining two state-of-the-art CFD tools, SPRINT and INCA, in a manner which extends the utility of both codes beyond what is possible from either code alone. The speed and efficiency of the PNS code, SPRING, has been combined with the capability of a Navier-Stokes code to model fully elliptic, viscous separated regions on high performance, high speed flight systems. The coupled SPRINT/INCA capability is applicable for design and evaluation of high speed flight vehicles in the supersonic to hypersonic speed regimes. This paper describes the codes involved, the interface process and a few selected test cases which illustrate the SPRINT/INCA coupling process. Results have shown that the combination of SPRINT and INCA produces correct results and can lead to improved computational analyses for complex, three-dimensional problems.

8259 (TTKK-LT–92) **Particle-turbulence interaction in dilute suspensions.** Karema, H. Tampere Univ. of Technology (Finland). Thermal Engineering. 1993. 79p. Order Number DE95737624. Source: OSTI; NTIS.

The interaction between particles and fluid turbulence in dilute suspensions is studied in this work. It is done by dividing the problem into two separate issues where the first one treats the response of a particle to fluid turbulence and the second one the modification of fluid turbulence caused by the particles. The ideas developed on the basis of these two issues are then used to analyse the transversal mixing rate of a passive scalar in an upward fully developed flow of a gas-particle suspension. Special interest in this case is in the capability of the gradient-diffusion model to predict the experimentally obtained changes in the mixing rate. The intention of this work is to indicate the most important parameters of the particle-turbulence interaction with their individual effects. It is done on the base of currently available and verified results intentionally avoiding advanced speculations. Because of the long term interest in a common frame-work of dilute and dense suspension the emphasis is on an Eulerian approach. The governing phenomenon in the turbulent dispersion of particles is the effect of crossing trajectories caused by the drift velocity. The resulting particle diffusion coefficient is considerably lower than the corresponding fluid point diffusion coefficient. Particle inertia has minor importance in producing a slight increase in diffusion coefficient. The importance of the two parameters of interaction, the ratio of the particle diameter to the integral length scale of the fluid and the particle Reynolds number, are strongly supported by experimental observations and theoretical hypothesis. According to these guide lines small particles tend to attenuate turbulence and large particles tend to augment it.

8260 (TTKK-LT–93) **Heat transfer and hydrodynamics of falling liquid films.** Haerkoenen, M.; Aula, A.; Aittomaeki, A. Tampere Univ. of Technology (Finland). Thermal Engineering. 1993. 72p. Order Number DE95737625. Source: OSTI; NTIS.

A series of heat transfer experiments is performed with saturated pure water and sugar/water solution films flowing down on outside surface of a smooth or fluted vertical stainless steel tube near atmospheric pressure. Experimental apparatus is designed and built. Data on length-averaged heat transfer coefficient are presented in a range of Prandtl numbers $2 < Pr < 20$ with wall heat fluxes up to 30 kW/m_2. Results show that the measured heat transfer coefficient does not agree very well with the well-known correlation of Chun and Seban. A new corrected heat transfer correlation is presented. Results with fluted tube are presented and a comparison with smooth tube shows, that the heat transfer is increased slightly more than the increased heat transfer area presumes. Film thickness measurements are carried out by a specially designed probe assembly. Wave frequencies and wave lengths are also determined. According to the measurements the typical wave frequency is about 10-15 Hz near the film distribution device and is rapidly decreasing to the value of about 5 Hz. Measured film thickness and wave velocity show a trend according to some literature correlations.

4205 Materials Testing

Refer also to citation(s) 7534, 7660, 7692, 7697, 8076

8261 (ANL/ASD/CP–84555) **A new target concept for production of slow positrons.** Qian, Y.L; White, M. Argonne National Lab., IL (United States). [1995]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-941129–11: 13. international conference on the application of accelerators in research and industry, Denton, TX (United States), 7-10 Nov 1994). Order Number DE95004596. Source: OSTI; NTIS; INIS; GPO Dep.

Slow positrons in the energy range up to a few keV are useful for material sciences and surface studies. The Advanced Photon Source (APS) linear accelerator (linac) was designed to produce 8-mA of 450-MeV positrons. A 200-MeV, 1.7-Ampere electron beam impinges on a 7-mm-thick (2 radiation lengths) tungsten target, resulting in bremsstrahlung pair production of electrons and positrons. The existing target was optimized for high energy positron production, and most slow positrons produced by the electron-gamma shower remain trapped inside. The linac could also be used to produce slow positrons, and a modified target could increase the low energy positron yield. Use of a multilayer or

segmented target reduces self-absorption by the target, and thus more fully utilizes the incident beam power for slow positron production. A slow positron yield of 10^9/sec is expected from the existing incident electron beam. Multilayer targets could probably be used by other accelerator-based slow positron sources to improve slow positron yield without increasing the incident beam power. Two variations of a multilayer target concept are presented and discussed in this paper.

8262 (KAERI/RR–1255/93) **Development of nondestructive testing technology for the crack-like defects of steam generator tubes (II).** Cheong, Yong Moo (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Park, Jong Hyun; Huh, Hyung; Kang, Ki Won. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Dec 1993. 68p. (In Korean). Order Number DE95612782. Source: OSTI; NTIS; INIS.

In order to develop the nondestructive testing technology for the cracks at the tube expansion region in steam generator ultrasonic technique using leaky surface wave was applied for the detection of simulated crack-like defects of the 304 stainless steel plate. The ultrasonic technique shows higher detectability for the simulated cracks than conventional eddy current technique (MRPC, Motorized Rotating Pancake Coil). The ultrasonic technique could reduce some error encountered in the measurement of crack length. However, since the ultrasonic technique is not a well-established method for the crack in steam generator tubings at present, it could be used as a supplementary method for improving reliability on the detection of crack-like defects and accurate measurement of the crack length, in addition to the basic eddy current technique (MRPC). (Author).

8263 (KAERI/RR–1272/93) **A study on the irradiation effect on reactor materials using a cyclotron.** Hong, Jun Hwa (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Chi, Se Hwan; Lee, Bong Sang; Park, Duck Gun; Park, Jong Man; Oh, Jong Myung. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jan 1994. 106p. (In Korean). Order Number DE95612783. Source: OSTI; NTIS; INIS.

Effects of proton or neutron irradiation on domestic 12Cr-1MoV and SA 508 C1.3 steels were evaluated by small-scale specimen test techniques, i.e, small punch (SP) and miniaturized tensile specimen (MTS) test. Two critical irradiation conditions, i.e, fluence and irradiation temperature, were determined to describe and compare each test result together by E-DEP-1.ext code (TRIM code) and low melting point eutectic alloys. Test results showed that these techniques can be used for evaluating irradiation effects in terms of standard specimen fracture parameters, provided a sufficient data base is prepared for size effects and ϵ_{qf} - J_{IC} relation. (Author).

8264 (KAERI/RR–1336/93) **Material performance evaluation -Development of the advanced nuclear materials-.** Kim, Uh Chul (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Yang, Kyung Rin; Nho, Kye Ho; Chung, Han Sub; Kim, Hong Pyo; Hwang, Sung Sik; Han, Jeong Ho; Lee, Eun Hee; Lee, Deok Hyun; Hur, Do Haeng. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jul 1994. 213p. (In Korean). Order Number DE95612784. Source: OSTI; NTIS; INIS.

A multifrequency ACPD system was assembled. A SSRT equipment for stress corrosion cracking test was installed. A 25-ton capacity fatigue test machine was purchased as a first step to assemble a corrosion fatigue test facility. A test loop was designed to simulate the primary water chemistry condition. An Ag/AgCl external reference electrode which can be used at a temperature as high as 280 deg C was fabricated. A high temperature pH electrode was designed for fabrication. A creep test machine was designed conceptually for testing creep behaviors of Zr alloys. Preliminary design requirements were made for the instrumented capsule and a plan was made for using the uninstrumented capsule, as parts of activities to complete an integrated plan of in-reactor materials irradiation test. CHEC computer code which helped improving maintenance program against erosion/corrosion of secondary pipings of nuclear power plants was purchased. Erosion/corrosion of feedwater heater drain line of Kori Unit One was analyzed using the CHEC code as a sample calculation. (Author).

8265 (STUDSVIK-M–94-131) **Relining of pipelines for natural gas distribution (Swage-lining).** Leijstroem, H. Studsvik Material AB, Nykoeping (Sweden). Oct 1994. 52p. (In Swedish). Order Number DE95737678. Source: OSTI; NTIS.

Pressure testing during almost two years have shown that Swage-lined test pipes have good long-life properties. There are, however, certain indications that Swage-lined pipes have a somewhat shorter long-time strength. The reason may be scratches that arises during the lining process. The scratches are not judged as life-time limiting as long as they are not deeper than 1 mm. Inner stress measurements shows large differences between Swage-lined and not Swage-lined pipes. For Swage-lined pipes the maximum tangential inner stress in the pipe wall have completely disappeared, at the same time as high axial inner stresses are measured (large relative decrease in length). 12 refs

4210 Combustion Systems

Refer also to citation(s) 7550

8266 (DOE/METC–94/1009) **Aerovalve pulse combustion: Technical note.** Richards, G.A.; Gemmen, R.S.; Narayanaswami, L. USDOE Morgantown Energy Technology Center, WV (United States). Jul 1994. 33p. Sponsored by USDOE, Washington, DC (United States). Order Number DE94012262. Source: OSTI; NTIS; GPO Dep.

The authors present a mathematical model and an experimental investigation of aerodynamically valved pulse combustion. The model uses a control-volume approach to solve conservation laws in several regions of a pulse combustor. Mixing between the fresh charge and combustion products is modeled as a two-step process, with the mixing occurring slowly for a specified eddy time during each cycle, and then changing to a higher rate. Results of model simulations demonstrate that eddy time plays a significant role in determining the frequency and amplitude of combustion oscillation. The authors show that short eddy times produce steady, rather than pulsating, combustion. And they show that changes to the mixing process alter the temperature-species history of combustion gases in a manner that could prevent or promote the formation of nitrogen oxides, depending on specific mixing rates. The relatively simple control-volume approach used in this model allows rapid investigation of a wide range of geometric and operating parameters, and also defines characteristic length and time scales relevant to aerovalve pulse combustion. Experimental measurements compare favorably to model predictions. The authors place particular emphasis on time-averaged pressure differences through the combustor, which act as an indicator of pressure gain performance. They investigate both operating conditions and combustor geometry, and they show that a complex interaction between the inlet and exit flows of a combustor makes it difficult to produce general correlations among the various parameters. They use a scaling rule to produce a combustor geometry capable of producing pressure gain.

8267 (KE–93002B) **A study on the multi-stage combustion in incinerator with low pollution.** Park, S.I. (Korea Institute of Energy Research, Taejon (Korea, Republic of)); Dong, S.K.; Park, Y.J.; Choi, K.B. No corporate text available. Dec 1993. 162p. (In Korean). Order Number DE95744282. Source: OSTI; NTIS (US Sales Only).

The pollutant emission of incinerator depends largely on the design of afterburner. As large amount of particulates are included in the flue gas from incinerator, the longer residence time is established by forming swirl flow in the afterburner. In this study, two afterburner configurations were selected. The 3-dimensional flow and combustion in the model are analyzed and emission characteristics were evaluated. Also, the flow in the model was visualized using water model. And the 3-dimensional flow was measured using the 5-hole pitot tube. The mixing characteristics of flow was investigated by measuring CO concentration distribution at the model exit. As a result, the effect of swirl flow on the mixing was relatively small and the effect of high velocity flow from nozzles was significant. (author). refs., figs., tabs.

4260 Components, Electron Devices and Circuits

Refer also to citation(s) 8106, 8131, 9176

8268 (ANL–94/39) **Practical superconductor development for electrical power applications, annual report for FY 1994.** Balachandran, U. Argonne National Lab., IL (United States). Oct 1994. 63p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. Order Number DE95006075. Source: OSTI; NTIS; GPO Dep.

Development of useful high-critical-temperature superconductors requires synthesis of superconducting compounds; fabrication of wires, tapes, and films from these compounds; production of composite structures that incorporate stabilizers or insulators; and design and testing of efficient components. This report describes technical progress of research and development efforts aimed at producing superconducting components in the Y-Ba-Cu, (Bi,Pb)-Sr-Ca-Cu, (Tl,Pb,Bt)-(Ba,Sr)-Ca-Cu. and Hg-Ba-Ca-Cu-0 oxide systems. Topics discussed are synthesis and heat treatment of high-Tc superconductors, formation of monolithic and composite conductors. characterization of structures and superconducting and mechanical properties, and fabrication and testing of prototype components. Collaborations with industry and academia are documented.

8269 (ANL/ASD/CP–83682) **Ultrafast, high precision gated integrator.** Wang, X. Argonne National Lab., IL (United States). [1995]. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9410219–23: Beam instrumentation workshop, Vancouver (Canada), 2-6 Oct 1994). Order Number DE95004616. Source: OSTI; NTIS; GPO Dep.

An ultrafast, high precision gated integrator has been developed by introducing new design approaches that overcome the problems associated with earlier gated integrator circuits. The very high speed is evidenced by the output settling time of less than 50 ns and 20 MHz input pulse rate. The very high precision is demonstrated by the total output offset error of less than 0.2mV and the output droop rate of less than $10\mu V/\mu s$. This paper describes the theory of this new gated integrator circuit operation. The completed circuit test results are presented.

8270 (LBL–36055) **Undulators for short wavelength FEL amplifiers.** Schlueter, R. (Lawrence Berkeley Lab., CA (United States). Accelerator and Fusion Research Div.). Lawrence Berkeley Lab., CA (United States). Aug 1994. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00098. (CONF-9408146–14: 16. international free electron laser conference, Stanford, CA (United States), 21-26 Aug 1994). Order Number DE95004690. Source: OSTI; NTIS; INIS; GPO Dep.

Issues critical to the design of undulators for use in short wavelength FEL amplifiers, such as attainable on-axis field strength, device compactness, field quality, required magnetic gap, and strong focusing schemes, are discussed. The relative strength of various undulator technologies, including pure permanent magnet, hybrid, warm electromagnetic, pulsed, and superconducting electromagnetic devices in both helical and planar configurations are reviewed. Favored design options for proposed short wavelength FELs, such as the Linac Coherent Light Source at SLAC and the DUV Free-Electron Laser at BNL, are presented.

8271 Method and apparatus for measuring the intensity and phase of an ultrashort light pulse. Kane, D.J.; Trebino, R.P. 1992. Filed date 26 Oct 1992. U.S. Patent Application 7-966,644. 23p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. Order Number DE95006140. Source: OSTI; NTIS (US Sales Only); GPO Dep.

The pulse shape I(t) and phase evolution $_x$(t) of ultrashort light pulses are obtained using an instantaneously responding nonlinear optical medium to form a signal pulse. A light pulse, such a laser pulse, is split into a gate pulse and a probe pulse, where the gate pulse is delayed relative to the probe pulse. The gate pulse and the probe pulse are combined within an instantaneously responding optical medium to form a signal pulse functionally related to a temporal slice of the gate pulse corresponding to the time delay of the probe pulse. The signal pulse is then input to a wavelength-selective device to output pulse field information comprising intensity vs. frequency for a first value of the time delay. The time delay is varied over a range of values effective to yield an intensity plot of signal intensity vs. wavelength and delay. In one embodiment, the beams are overlapped at an angle so that a selected range of delay times is within the intersection to produce a simultaneous output over the time delays of interest.

8272 Visible light emitting vertical cavity surface emitting lasers. Bryan, R.P.; Lott, J.A.; Olbright, G.R.; Schneider, R.P. To Dept. of Energy. 1992. Filed date 5 Nov 1992. U.S. Patent Application 7-972,820. 21p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-76DP00789. Order Number DE95006108. Source: OSTI; NTIS (US Sales Only); GPO Dep.

A vertical cavity surface emitting laser that emits visible radiation is built upon a substrate, then having mirrors, the first mirror on top of the substrate; both sets of mirrors being a distributed Bragg reflector of either dielectrics or other materials which affect the resistivity or of semiconductors, such that the structure within the mirror comprises a plurality of sets, each having a thickness of λ/2n where n is the index of refraction of each of the sets; each of the mirrors adjacent to spacers which are on either side of an optically active bulk or quantum well layer; and the spacers and the optically active layer are from one of the following material systems: $In_2(Al_yGa_{1-y})_{1-z}P$, InAlGaAs, AlGaAs, InGaAs, or AlGaP/GaP, wherein the optically active region having a length equal to m $\lambda/2n_{eff}$ where m is an integer and n_{eff} is the effective index of refraction of the laser cavity, and the spacer layer and one of the mirrors being transmissive to radiation having a wavelength of λ/n, typically within the green to red portion of the visible spectrum.

8273 Temperature-insensitive phase-matched optical harmonic conversion crystal. Barker, C.E.; Eimerl, D.; Velsko, S.P.; Roberts, D. 1992. Filed date 25 Nov 1992. U.S. Patent Application 7-981,636. 35p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. Order Number DE95006122. Source: OSTI; NTIS (US Sales Only); GPO Dep.

Temperature-insensitive, phase-matched harmonic frequency conversion of laser light at a preferred wavelength of 1.064 microns can be achieved by use of a crystal of deuterated 1-arginine phosphate. The crystal is cut and oriented so that the laser light propagates inside the crystal along one of several required directions, which correspond to a temperature-insensitive, phase-matching locus. The method of measuring and calculating the temperature-insensitive, phase-matching angles can be extended to other fundamental wavelengths and other crystal compositions.

8274 Linear optocoupler. Kronberg, J.W. To Dept. of Energy. 1992. Filed date 21 Dec 1992. U.S. Patent Application 7-993,553. 16p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE95006114. Source: OSTI; NTIS (US Sales Only); GPO Dep.

An optocoupler for isolating electrical signals is disclosed that translates an electrical input signal linearly to an electrical output signal. The optocoupler comprises a light emitter, a light receiver, and a light transmitting medium. The light emitter, preferably a blue, silicon carbide LED, is of the type that provides linear, electro-optical conversion of electrical signals within a narrow wavelength range. Correspondingly, the light receiver, which-converts light signals to electrical signals and is preferably a cadmium sulfide photoconductor, is linearly responsive to light signals within substantially the same wavelength range as the blue LED. The device can be used to isolate two parts of an electrical circuit.

8275 (PPPL–3031) **Progress in compact soft x-ray lasers and their applications.** Suckewer, S.; Skinner, C.H. Princeton Univ., NJ (United States). Plasma Physics Lab. Jan 1995. 17p. Sponsored by USDOE, Washington, DC (United States);National Science Foundation, Washington, DC (United States). DOE Contract AC02-76CH03073. Order Number DE95006232. Source: OSTI; NTIS; INIS; GPO Dep.

The ultra-high brightness and short pulse duration of soft x-ray lasers provide unique advantages for novel applications. A crucial factor in the availability of these devices is their scale and cost. Recent breakthroughs in this field has brought closer the advent of table-top devices, suitable for applications to fields such as x-ray microscopy, chemistry, material science, plasma diagnostics, and

lithography. In this article we review recent progress in the development of compact (table-top) soft x-ray lasers.

8276 (SAND–94-2206C) **Laser beam characterization results for a high power CW Nd:YAG laser.** Keicher, D.M. Sandia National Labs., Albuquerque, NM (United States). [1994]. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. (CONF-950226–1: SPIE '95: SPIE conference on optics, electro-optics, and laser application in science, engineering and medicine, San Jose, CA (United States), 5-10 Feb 1995). Order Number DE95006319. Source: OSTI; NTIS; GPO Dep.

In an effort to understand multimode laser beam propagation characteristics for better development of laser material processing applications, beam diagnostic experiments were performed on a 1800 watt CW Nd:YAG laser. Beam diameter data were acquired at approximately 12 positions along the beam optical axis about the minimum waist created by a long focal length single element lens at several power levels. These data were then used to evaluate the laser output beam characteristics using two differing techniques. For the ISO technique, two data points from the beam diameter data were used in determining the output laser beam characteristics. These points were the beam minimum waist diameter and the diameter at a point along the beam optical axis where the beam diameter had increased to approximately 0.7 times that of the beam minimum waist diameter. The second analysis technique involved fitting the entire data set to theoretical equations used to describe the multimode laser beam propagation and points from the fitted curve fit were then used to determine the output beam characteristics from the laser. For all power levels evaluated, calculated results predicting the laser beam minimum waist location were in agreement with measured values and more consistent using the curve-fit technique than the two-point evaluation technique.

8277 (SAND–94-2531C) **High-performance GaAs/AlGaAs optical modulators: Their performance and packaging for microwave photonic integrated circuits.** Kravitz, S.H. (and others); Hietala, V.M.; Vawter, G.A. Sandia National Labs., Albuquerque, NM (United States). [1994]. 2p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. (CONF-941247–1: 1994 Asia-Pacific microwave conference, Tokyo (Japan), 6-9 Dec 1994). Order Number DE95004533. Source: OSTI; NTIS; GPO Dep.

The goal of this effort is to build and package photonic integrated circuits (PICs). This infers that compact device design is very important, with all building blocks of the circuit aimed toward integration, low voltage operation, and manufacturability. With such a device, it is important that optical packaging by considered in the initial design. To this end, an advanced photonic packaging concept was designed. This concept employs vertical coupling of light both in and out of the package. This package concept is aimed at hermeticity, with no fiber penetrations through the walls of the package. This paper will describe the building blocks of this package, including output gratings, binary optics, and an automatic fiber capture device, called CLASP.

8278 (SAND–94-2731) **Transient radiation-induced absorption in materials for the DOI laser.** Brannon, P.J. Sandia National Labs., Albuquerque, NM (United States). Jan 1995. 27p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. Order Number DE95004549. Source: OSTI; NTIS; GPO Dep.

This is the final report on a series of experiments concerned with transient radiation-induced absorption in materials for a Cr,Nd:GSGG laser. Both the Sandia National Laboratories SPR III pulsed reactor and the Hermes III pulsed X-ray machine are used as radiation sources. The time dependence and the magnitude of the induced absorption in filter glasses and in doped and undoped $LiNbO_3$ Q-switch materials have been measured. Gain has been observed in Cr,Nd:GSGG, the laser medium, when it is irradiated by X-rays.

8279 (SAND–94-2922C) **Micro heat spreader enhanced heat transfer in MCMs.** Shen, D.S.; Mitchell, R.T.; Dobranich, D.; Adkins, D.R.; Tuck, M.R. Sandia National Labs., Albuquerque, NM (United States). [1994]. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. (CONF-950154–1: Multi chip module conference, Santa Cruz, CA (United States), 31 Jan - 2 feb 1995). Order Number DE95004520. Source: OSTI; NTIS; GPO Dep.

The peak thermal power generated in microelectronics assemblies has risen from less than 1 W/cm^2 in 1980 to greater than 40 W/cm^2 today, due primarily to increasing densities at both the IC and packaging levels. The authors have demonstrated enhanced heat transfer in a prototype Si substrate with a backside micro heat channel structure. Unlike conventional micro heat pipes, these channels are biaxial with a greater capacity for fluid transfer. Thermal modeling and preliminary experiments have shown an equivalent increase in substrate thermal conductivity to over 500 W/m·K, or a four times improvement. Optimization of the structure and alternative liquids will further increase the thermal conductivity of the micro heat channel substrate with the objective being polycrystalline diamond, or about 1,200 W/m·K. The crucial design parameters for the micro heat channel system and the thermal characteristics of the system will be covered.

43 PARTICLE ACCELERATORS

Refer also to citation(s) 7685

8280 (JINR-R–9-94-261) **Parameters Calculation of Three Stage TRITRON-Type Accelerator.** Vorozhtsov, S.B.; Dmitrievskij, V.P.; Karamysheva, G.A. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems. 1994. 7p. (In Russian). Order Number DE95612720. Source: OSTI; NTIS (US Sales Only); INIS.

The calculations of structure of the accelerator complex, which consists of three TRITRON-type accelerators, are presented. The results of the calculations of the longitudinal motion of particles are given. These results demonstrate that the complex can accelerate protons from 20 to 760 MeV. (author). 3 refs.; 4 figs.; 1 tab.

8281 (SLAC-PUB–6735) **Status and future prospects for United States accelerators and accelerator physics.** Siemann, R.H. Stanford Linear Accelerator Center, Menlo Park, CA (United States). Dec 1994. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-940816–74: Meeting of the Division of Particles and Fields of the American Physical Society, Albuquerque, NM (United States), 2-6 Aug 1994). Order Number DE95006073. Source: OSTI; NTIS; INIS; GPO Dep.

The recent performance and future prospects of accelerators in the United States are reviewed. The next decade promises significant improvements and major new facilities. There is uncertainty beyond that because of the SSC cancellation and the new, enhanced importance of international accelerator projects.

4301 Design, Development, and Operation

Refer also to citation(s) 7325, 8917

8282 (BNL–60283) **Concepts and techniques: Active electronics and computers in safety-critical accelerator operation.** Frankel, R.S. Brookhaven National Lab., Upton, NY (United States). [1995]. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-941061–12: Nuclear science symposium: medical imaging conference, Norfolk, VA (United States), 30 Oct - 5 nov 1994). Order Number DE95003946. Source: OSTI; NTIS; INIS; GPO Dep.

The Relativistic Heavy Ion Collider (RHIC) under construction at Brookhaven National Laboratory, requires an extensive Access Control System to protect personnel from Radiation, Oxygen Deficiency and Electrical hazards. In addition, the complicated nature of operation of the Collider as part of a complex of other Accelerators necessitates the use of active electronic measurement circuitry to ensure compliance with established Operational Safety Limits. Solutions were devised which permit the use of modern computer and interconnections technology for Safety-Critical applications, while preserving and enhancing, tried and proven protection methods. In addition a set of Guidelines, regarding required performance for Accelerator Safety Systems and a Handbook of design

criteria and rules were developed to assist future system designers and to provide a framework for internal review and regulation.

8283 (BNL–61014) **Possible use of the AGS linac for proton therapy.** Alessi, J.G.; Chanana, A.; Dilmanian, F.A.; Lee, Y.Y.; Raparia, D.; Tuozzolo, J.; Wielopolski, L. Brookhaven National Lab., Upton, NY (United States). [1995]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-9411160–1: 21. proton therapy cooperative group (PTCOG) meeting, Chiba (Japan), 14-16 Nov 1994). Order Number DE95003959. Source: OSTI; NTIS; INIS; GPO Dep.

The BNL 200 MeV linac presently provides beam for the AGS high energy physics program and for isotope production at the Brookhaven Linac Isotope Producer (BLIP) facility. There is now a proposal to develop a proton therapy facility which would also use the linac beam. Approximately 1% of the current in each linac beam pulse would be diverted from BLIP, down an existing transport line, to the proposed new facility. This paper focuses on the basic design of the facility, particularly the accelerator issues. The planned transport line layout is presented, along with a description of the energy and intensity control, and beam delivery systems. In the initial phase, we are planning one 360° vertical gantry and one horizontal treatment room.

8284 (BNL–61267) **A high-energy high-luminosity $\mu^+ - \mu^-$ collider.** Neuffer, D.V. (Continuous Electron Beam Accelerator Facility, Newport News, VA (United States)); Palmer, R. Brookhaven National Lab., Upton, NY (United States). Jun 1994. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-940618–116: 4. European particle accelerator conference, London (United Kingdom), 27 Jun - 1 jul 1994; CAP–109-MUON-94C). Order Number DE95006097. Source: OSTI; INIS; NTIS; GPO Dep.

We present a candidate design for a high-energy high luminosity μ^+-μ collider, with E_{cm} = 4 TeV, L = 10^{34} $cm^{-2}S^{-1}$, using only existing technology. The design uses a rapid-cycling medium-energy proton synchrotron, which produces proton beam pulses which are focused onto two π- producing targets, with two π-decay transport lines producing μ^+'s and μ^-'. The μ's are collected, rf-rotated, cooled and compressed into a recirculating linac for acceleration, and then transferred into a storage ring collider. The keys to high luminosity are maximal μ collection and cooling; innovations with these goals are included.

8285 (DOE/ER/40128–T8) **Inverse Cerenkov LPA experiments. 1986 Annual report.** Spectra Technology, Inc., Bellevue, WA (United States). 16 Dec 1986. 16p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-83ER40128. Order Number DE95004622. Source: OSTI; NTIS; GPO Dep.

This report discusses the progress made on laser particle acceleration. First a brief discussion of the collaboration with the University of California at Santa Barbara to examine the technical trade-offs involved in the choice of an inverse Cerenkov (IC) demonstration experiment. The goals of the IC demonstration experiment are to show the applicability of the IC mechanism to electron beam focusing and acceleration. The second part of this report covers glancing incidence measurements of mirrors. The work being performed centers around the issue of dielectric overcoats on metal mirrors. In any type of laser particle accelerator careful consideration of the timing, phasing, and alignment between laser and particle beams must be incorporated in a complete system study. Analysis of these problems has been initiated and a survey of preliminary results are covered in the last part of this report. During this year, Spectra Technology Inc. (STI) has collaborated with Prof. Jorge Fontana, of the University of California, Santa Barbara (UCSB), to examine the technical trade-offs involved in the choice of an inverse Cerenkov (IC) demonstration experiment. Prof. Fontana's responsibilities have been to address the rationale and requirements for the demonstration experiment, including an evaluation and selection of the most attractive test site and facilities. At STI, the options available for the laser and optics, needed to satisfy these requirements, are being examined. The goals of this IC demonstration experiment are to show the applicability of the IC mechanisms to electron beam focusing and acceleration.

8286 (DOE/ER/40128–T9) **Inverse Cerenkov laser accelerator experiment annual report. 1990 Annual report.** Spectra Technology, Inc., Bellevue, WA (United States). 29 Mar 1991. 28p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-83ER40128. Order Number DE95004623. Source: OSTI; NTIS; GPO Dep.

During the past year further progress was made on preparations for the Spectra Technology, Inc. (STI) inverse Cerenkov acceleration (ICA) experiment to be performed on the Accelerator Test Facility (ATF) at Brookhaven National Laboratory. Major progress was made in the design and fabrication of the experimental apparatus. This includes the gas cell, where the ICA process occurs, and the optical system that converts the CO_2 laser beam into a radially polarized beam. In terms of progress on theoretical work, the authors finished optimizing the ATF ICA design parameters using their Monte Carlo computer simulation. The optimized design predicts for the ATF conditions that over 50% energy gain should be observed. They published a paper on an improved method of performing ICA by operating near the resonance of a gas. They also began analysis of a method of accelerating particles in a vacuum using a radially polarized beam and axicon focusing. Although this new method can no longer be considered ICA, it has the potential of high acceleration gradients without the drawbacks of gas scattering and gas breakdown. Three papers were published and two conference papers were presented during 1990.

8287 (DOE/ER/40128–T10) **100 MeV laser accelerator demonstration and 1 GeV baseline design development. 1992 Annual report.** STI Optronics, Bellevue, WA (United States). 1 Dec 1992. 30p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-83ER40128. Order Number DE95004624. Source: OSTI; NTIS; INIS; GPO Dep.

The acceleration of relativistic electrons using the inverse Cerenkov effect was first demonstrated at Stanford University in 1981. Later, Fontana and Pantell developed an improved configuration for the inverse Cerenkov acceleration (ICA) process. A radially polarized laser beam is focused by an axicon onto the e-beam traveling through a gas-filled interaction region. The light intersects the e-beam at the Cerenkov angle θ_c, where $\theta_c = \cos^{-1}(1/n\beta)$, n is the index of refraction of the gas, and β is the ratio of the electron velocity to the speed of light. The goal of the present program is to demonstrate improved laser acceleration using the Fontana and Pantell configuration. The experiments will be performed on the Accelerator Test Facility (ATF) located at Brookhaven National Laboratory (BNL). This facility features a 50 MeV linac fed by a Nd:YAG (4ω) laser-driven photocathode e-gun. It will be upgraded to 65 MeV in the near future. The ATF also has a high peak power CO_2 laser, which was developed for laser acceleration studies. The present ICA experiment was divided into two phases. Phase 1 was to examine certain experimental issues in preparation for Phase 2. Phase 1 was successfully completed in the spring of 1992. Phase 2 is to perform the actual laser acceleration experiments on the ATF e-beam. The authors are currently waiting for the availability of the e-beam so that they can begin the Phase 2 experiments. In this section, the theory and experimental hardware for the present program are described. The results of the Phase 1 experiments are presented, and an update on the Phase 2 experiment is given.

8288 (JINR-D–15-93-80) **Microtron MT-25. Workshop on application of microtrons in nuclear physics.** Gangrskij, Yu.P. (ed.). Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1993. 119p. (In Russian). (CONF-9209490–: Workshop on application of microtrons in nuclear physics, Plovdiv (Bulgaria), 22-24 Sep 1992). Order Number DE95611718. Source: OSTI; NTIS (US Sales Only); INIS.

Problems of development of microtron equipment and construction of microtrons at scientific centers of JINR country-members are discussed. Results of experimental conducted in microtron beams are presented in the directions of photonuclear reactions, fission reactions, activation analysis.

8289 (JINR-D–15-93-80, pp. 6-11) **Present status on organization of nuclear-physical laboratory 'MICROTRON' in Plovdiv University.** Belov, A.G. (Joint Inst. for Nuclear Research, Dubna (Russian Federation)); Cholakov, V.D.; Srents, A.K.; Khristov, Kh.G.; Balabanov, N.P. Joint Inst. for Nuclear Research,

Dubna (Russian Federation). 1993. 119p. (In Russian). (CONF-9209490–: Workshop on application of microtrons in nuclear physics, Plovdiv (Bulgaria), 22-24 Sep 1992). In *Microtron MT-25. Workshop on application of microtrons in nuclear physics.* Order Number DE95611718. Source: OSTI; NTIS (US Sales Only); INIS.

The paper describes the status of the development and construction of a microtron in Plovdiv, Bulgaria, in cooperation with the Laboratory of nuclear reactions in Dubna, Russia. The schedule takes into account the application of powerful bremsstrahlung and neutron radiation. Maximum electron energy -25 MeV; average current of accelerated electrons - 25 μA. The area of the laboratory building - 1000 m^2. 8 refs., 1 tab.

8290 (JINR-D–15-93-80, pp. 12-19) **Microtron MT-25. (Electromagmet design, operating experience).** Belov, A.G. (Joint Inst. for Nuclear Research, Dubna (Russian Federation)). Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1993. 119p. (In Russian). (CONF-9209490–: Workshop on application of microtrons in nuclear physics, Plovdiv (Bulgaria), 22-24 Sep 1992). In *Microtron MT-25. Workshop on application of microtrons in nuclear physics.* Order Number DE95611718. Source: OSTI; NTIS (US Sales Only); INIS.

The paper describes the results of operations at MT-22 microtron carried out to produce ^{123}I, ^{11}C, ^{15}O and ^{13}N radioisotopes via increase of the number of orbits. 25 MeV MT-25 microtron operation experience is described. MT-25 microtron operated for about 5000 hours. All operation problems reside in the replacement of the magnetron, SHF-generator bulb, resonator and some vacuum seals. 9 refs., 4 figs., 2 tabs.

8291 (JINR-D–15-93-80, pp. 20-25) **Microtron MT-25 and its areas of use.** Belov, A.G. (Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Reactions); Buklanov, G.V.; Korotkin, Yu.S.; Oganessian, Yu.Ts.; Starodub, G.Ja.; Zhuchko, V.E. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1993. 119p. (CONF-9209490–: Workshop on application of microtrons in nuclear physics, Plovdiv (Bulgaria), 22-24 Sep 1992). In *Microtron MT-25. Workshop on application of microtrons in nuclear physics.* Order Number DE95611718. Source: OSTI; NTIS (US Sales Only); INIS.

Microtron MT-25 fields of application are described. The microtron was built in 1972 at JINR and during 20 years some changes in construction have been made. Now in MT-25 electron beam energy attained 25 MeV and beam current equals to 20 mA. One of the main applications is the determination of gold content in geological and technological samples. The production of I^{123} of total activity about 20-40 Ci for a year is the second use of MT-25. 7 refs., 2 figs.

8292 (JINR-D–15-93-80, pp. 26-31) **Project of a laboratory for activation analysis on the basis of microtron MPR.** Baatarkhuu, D. (Joint Inst. for Nuclear Research, Dubna (Russian Federation)); Belov, A.G.; Gehrbish, Sh.; Zhuchko, V.E.; Sehrgehlehn, B.; Teterev, Yu.G.; Sodnom, N.; Sirazhet, Kh. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1993. 119p. (In Russian). (CONF-9209490–: Workshop on application of microtrons in nuclear physics, Plovdiv (Bulgaria), 22-24 Sep 1992). In *Microtron MT-25. Workshop on application of microtrons in nuclear physics.* Order Number DE95611718. Source: OSTI; NTIS (US Sales Only); INIS.

The paper describes MT-22 microtron and the design of the Activation Analysis Laboratory of the Mongolian People's Republic. The measurement-computation complex will be built on the basis of MIK-1 microcomputer and IBM XT PC. The microtron enables production of ^{123}I for medical diagnostics. 13 refs., 5 figs.

8293 (KAERI/RR–1213/92) **Development of high power free-electron lasers.** Lee, Jong Min (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Nam, Chang Hee; Hwang, Cheol Kyu; Choi, Byeong Ho; Cha, Hyeong Ki; Cha, Byeong Heon; Kim, Seong Ho; Lee, Byeong Cheol; Jeong, Ki Seok; Kim, Wan; Jin, Jeong Tae; Kim, Seon Kook; JeKorea Cancer Center Hospital, Seoul (Korea, Republic of). Dec 1992. 174p. (In Korean). Order Number DE95612722. Source: OSTI; NTIS; INIS.

A Millimeter Wave Free-Electron Laser has been designed and constructed. A Nd:glass laser has been constructed and the experiment of APM has been conducted for the development of the ultrashort high power laser. (Author).

8294 (LA-UR–94-4168) **An FEL design code running on Mathcad™.** Nguyen, D.C. (Los Alamos National Lab., NM (United States)); Gierman, S.M.; O'Shea, P.G. Los Alamos National Lab., NM (United States). [1994]. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9408196–2: FEL '94: nuclear instrument methods, Stanford, CA (United States), 21-26 Aug 1994). Order Number DE95005279. Source: OSTI; NTIS; INIS; GPO Dep.

We present a simple computer code called FEL-CAD that runs on the Mathcad™ software. FEL-CAD gives estimates of the expected performance of a low-gain Compton FEL oscillator driven by an rf linac. The code provides fast, albeit approximate, answers to basic FEL design questions. Scaling can be done by varying the wiggler, the linac, the electron beam and the optical resonator parameters.

8295 (LBL–36343) **Exotic colliders.** Chattopadhyay, S. Lawrence Berkeley Lab., CA (United States). Nov 1994. 19p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00098. (CBP–106; CONF-940681–6: Advanced accelerator concepts workshop, Lake Geneva, WI (United States), 13-18 Jun 1994). Order Number DE95004668. Source: OSTI; NTIS; INIS; GPO Dep.

The motivation, feasibility and potential for two unconventional collider concepts - the Gamma-Gamma Collider and the Muon Collider - are described. The importance of the development of associated technologies such as high average power, high repetition rate lasers and ultrafast phase-space techniques are outlined.

8296 (SLAC-PUB–6338) **Future accelerators and experiments.** Richter, B. Stanford Linear Accelerator Center, Menlo Park, CA (United States). Aug 1993. 25p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-8806240–2: Landau memorial conference on frontiers of physics, Tel Aviv (Israel), 6-10 Jun 1988). Order Number DE95005940. Source: OSTI; NTIS; INIS; GPO Dep.

This article describes the status of major new accelerator projects and prospects as of mid 1988. It looks at hadron colliders and electron positron colliders. The author looks both at the technology of the machines, and how it will have to be developed for future devices, and the effort required to extract the important physics information from the resulting reaction cascades which are exected to come out of these devices.

8297 (SLAC-PUB–6646) **Linear collider research and development.** Siemann, R.H. Stanford Linear Accelerator Center, Menlo Park, CA (United States). Aug 1994. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-9408125–45: 17. international LINAC conference, Tsukuba (Japan), 21-26 Aug 1994). Order Number DE95006059. Source: OSTI; NTIS; INIS; GPO Dep.

This paper presents a review of work being done on the design of linear colliders with center of mass energies near 0.5 TeV. These include TESLA, SBLC, NLC, JLC, VLEPP, and CLIC. Here the author touches on recent advances made on these designs. Items discussed include advances in the study of beam focusing and spot sizes in setups such as the Final Focus Test Beam, bunching concepts, development of high power RF systems, design of high gradient accelerator structures, and work on emittance features.

4302 Beam Dynamics, Field Calculations, and Ion Optics

Refer also to citation(s) 8381, 8860

8298 (ANL/APS/TB–20) **Bremsstrahlung scattering calculations for the beam stops and collimators in the APS insertion-device beamlines.** Job, P.K.; Haeffner, D.R.; Shu, D. Argonne National Lab., IL (United States). Dec 1994. 27p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. Order Number DE95005471. Source: OSTI; NTIS; INIS; GPO Dep.

Bremsstrahlung is produced in the APS storage ring by the interaction of positrons with the residual gas molecules in the vacuum chamber of the storage ring. The bremsstrahlung production causes a serious challenge in shielding the insertion-device beamlines because the entire straight section (15 meters) is in the line of sight of the beamline. The radiation emerges in a narrow cone tangential to the beam path with the characteristic emission angle $1/\gamma$, where γ is E/mc^2 which is the ratio of the kinetic energy to the rest mass for the positrons. This high-energy gamma radiation has an approximate 1/E spectrum with the maximum energy extending up to the particle energy (7 GeV for the APS). Bremsstrahlung, being high-energy photons, produces an electromagnetic shower when it encounters the beamline elements. A beamline element not thick enough to fully contain an electromagnetic shower can cause considerable scatter of the high-energy bremsstrahlung radiation. The low-energy component of the bremsstrahlung can also be scattered and create high dose rates in the first-optical and white-beam enclosures. The fully developed electromagnetic shower will have a photon spectrum almost independent of the material. The electromagnetic showers in the high-Z materials can also produce photoneutrons. This note reports the summary of EGS4 calculations performed on bremsstrahlung scattering from different beamline components in a typical APS insertion-device beamline. The related recommendations for shielding are also given. The shielding criterion adopted is a total dose rate of 2.5μSv/h (0.25 mrem/h) at 30 cm from the shield.

8299 (BNL–60999) **Proposal for using optical transition radiation for electron beam alignment and emittance measurement for the free emittance measurement for the free electron laser experiments at ATF.** Qiu, Xu Z.; Wang, Xijie; Ben-Zvi, I. Brookhaven National Lab., Upton, NY (United States). Oct 1994. 25p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. Order Number DE95005004. Source: OSTI; NTIS; INIS; GPO Dep.

Optical transiton radiation (OTR) produced from thin intercepting foils have been employed to image the spatial profile of the electron beam in several free electron laser experiments. It was found that the images from OTR were significantly sharper than the images produced from phosphor screens. Furthermore, OTR's sensitivity of its angular distribution and polarization to energy and divergence of the electron beam was exploited to diagnose energy and emittance of the electron beam. OTR has been proven to be vital in electron beam alignment in FEL experiments. This report gives a summary of the basic theory of transition radiation and techniques using transition radiation for electron beam imaging and emittance measurement. The possibility was explored for employing these techniques in the HGHG FEL and the visible FEL experiments in ATF (Accelerator Test Facility).

8300 (BNL–61007) **Crystalline beams: Theory, experiments, and proposals.** Ruggiero, A.G. Brookhaven National Lab., Upton, NY (United States). [1995]. 23p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-9406292–1: INFN elosiatron workshop on quantum-like models and coherent effects, Erice (Italy), 13-20 Jun 1994). Order Number DE95003955. Source: OSTI; NTIS; INIS; GPO Dep.

Crystalline Beams are an ordered state of an ensemble of ions, circulating in a storage ring, with very small velocity fluctuations. They can be obtained from ordinary warm ion beams with the application of intense cooling techniques (stochastic, electron, laser). A phase transition occurs when sufficiently small velocity spreads are reached, freezing the particle-to-particle spacing in strings, Zigzags, and helices ... The properties and the feasibility of Crystalline Beams depend on the choice of the lattice of the Storage Ring. There are three issues closely related to the design of the Storage Ring; namely: the determination of Equilibrium Configurations, Confinement Conditions, and Stability Conditions. Of particular concern is the effect of the trajectory curvature and of the beam momentum spread, since they set the requirements on the amount of momentum cooling, on the focussing, and on the distribution of bending in the lattice of the storage ring. The practical demonstration of Crystalline Beams may create the basis for an advanced technology for particle accelerators, where the limitations due to Coulomb intrabeam scattering and space-charge forces would finally be brought under control, so that beams of ions, more dense than normal, can be achieved for a variety of new applications.

8301 (LA-UR–94-3753) **Self-consistent beam halo studies & halo diagnostic development in a continuous linear focusing channel.** Jameson, R.A. Los Alamos National Lab., NM (United States). 1994. 25p. Sponsored by European Organization for Nuclear Research, Geneva (Switzerland). DOE Contract W-7405-ENG-36. (CONF-941186–1: Joint US-CERN-Japan topical course on accelerator physics and technology: frontiers of accelerator technology, Maui, HI (United States), 3-9 Nov 1994). Order Number DE95003706. Source: OSTI; NTIS; INIS; GPO Dep.

Beam halos are formed via self-consistent motion of the beam particles. Interactions of single particles with time-varying density distributions of other particles are a major source of halo. Aspects of these interactions are studied for an initially equilibrium distribution in a radial, linear, continuous focusing system. When there is a mismatch, it is shown that in the self-consistent system, there is a threshold in space-charge and mismatch, above which a halo is formed that extends to ~1.5 times the initial maximum mismatch radius. Tools are sought for characterizing the halo dynamics. Testing the particles against the width of the mismatch driving resonance is useful for finding a conservative estimate of the threshold. The exit, entering and transition times, and the time evolution of the halo, are also explored using this technique. Extension to higher dimensions is briefly discussed.

8302 (LBL–36024) **Parallel computation of automatic differentiation applied to magnetic field calculations.** Hinkins, R.L. (Univ. of California, Berkeley, CA (United States). Computer Science Dept.). Lawrence Berkeley Lab., CA (United States). Sep 1994. 26p. Sponsored by USDOE, Washington, DC (United States);National Science Foundation, Washington, DC (United States). DOE Contract AC03-76SF00098. Grant CDA-8722788. Order Number DE95004689. Source: OSTI; NTIS; INIS; GPO Dep.

The author presents a parallelization of an accelerator physics application to simulate magnetic field in three dimensions. The problem involves the evaluation of high order derivatives with respect to two variables of a multivariate function. Automatic differentiation software had been used with some success, but the computation time was prohibitive. The implementation runs on several platforms, including a network of workstations using PVM, a MasPar using MPFortran, and a CM-5 using CMFortran. A careful examination of the code led to several optimizations that improved its serial performance by a factor of 8.7. The parallelization produced further improvements, especially on the MasPar with a speedup factor of 620. As a result a problem that took six days on a SPARC 10/41 now runs in minutes on the MasPar, making it feasible for physicists at Lawrence Berkeley Laboratory to simulate larger magnets.

8303 (LBL–36180) **Design study of longitudinal dynamics of the drive beam in 1 TeV relativistic klystron two-beam accelerator.** Li, H.; Yu, S.S.; Sessler, A.M. Lawrence Berkeley Lab., CA (United States). Oct 1994. 20p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00098. (CONF-941101–2: Meeting of the Division of Plasma Physics of the American Physical Society, Minneapolis, MN (United States), 7-11 Nov 1994). Order Number DE95004683. Source: OSTI; NTIS; INIS; GPO Dep.

In this paper the authors present a design study on the longitudinal dynamics of a relativistic klystron two-beam accelerator (RK-TBA) scheme which has been proposed as a power source candidate for a 1 TeV next linear collider (NLC). They address the issue of maintaining stable power output at desired level for a 300-m long TBA with 150 extraction cavities and present their simulation results to demonstrate that it can be achieved by inductively detuning the extraction cavities to counter the space charge debunching effect on the drive beam. They then carry out simulation study to show that the beam bunches desired by the RK-TBA can be efficiently obtained by first chopping an initially uniform beam of low energy into a train of beam bunches with modest longitudinal dimension and then using the "adiabatic capture" scheme to bunch and accelerate these beam bunches into tight bunches at the operating energy of the drive beam. The authors have also examined

the "after burner" scheme which is implemented in their RK-TBA design for efficiency enhancement.

8304 (LBL–36233) **Design study of beam dynamics issues for 1 TeV next linear collider based upon the relativistic-klystron two-beam accelerator.** Li, H. (Lawrence Berkeley Lab., CA (United States)); Goffeney, N.; Henestroza, E.; Sessler, A.; Yu, S.; Houck, T.; Westenskow, G. Lawrence Berkeley Lab., CA (United States). Nov 1994. 20p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00098. (CONF-940681–5: Advanced accelerator concepts workshop, Lake Geneva, WI (United States), 13-18 Jun 1994). Order Number DE95004673. Source: OSTI; NTIS; INIS; GPO Dep.

A design study has recently been conducted for exploring the feasibility of a relativistic-klystron two-beam accelerator (RK-TBA) system as a rf power source for a 1 TeV linear collider. The author present, in this paper, the beam dynamics part of this study. They have achieved in their design study acceptable transverse and longitudinal beam stability properties for the resulting high efficiency and low cost RK-TBA.

8305 (LBL–36302) **The cooling of particle beams.** Sessler, A.M. Lawrence Berkeley Lab., CA (United States). Oct 1994. 17p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00098. (CONF-9411120–3: 4. Tamura symposium on accelerator physics, Austin, TX (United States), 14-16 Nov 1994). Order Number DE95004669. Source: OSTI; NTIS; INIS; GPO Dep.

A review is given of the various methods which can be employed for cooling particle beams. These methods include radiation damping, stimulated radiation damping, ionization cooling, stochastic cooling, electron cooling, laser cooling, and laser cooling with beam coupling. Laser Cooling has provided beams of the lowest temperatures, namely 1 mK, but only for ions and only for the longitudinal temperature. Recent theoretical work has suggested how laser cooling, with the coupling of beam motion, can be used to reduce the ion beam temperature in all three directions. The majority of this paper is devoted to describing laser cooling and laser cooling with beam coupling.

8306 (SLAC-PUB–6527) **Depolarization in the SLC Collider Arcs.** Emma, P. (Stanford Univ., CA (United States). Stanford Linear Accelerator Center); Limberg, T.; Rossmanith, R. Stanford Linear Accelerator Center, Menlo Park, CA (United States); Southeastern Universities Research Association, Inc., Newport News, VA (United States). Continuous Electron Beam Accelerator Facility. Jun 1994. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515 ; AC05-84ER40150. (CONF-940618–115: 4. European particle accelerator conference, London (United Kingdom), 27 Jun - 1 jul 1994). Order Number DE95005942. Source: OSTI; NTIS; INIS; GPO Dep.

In the 1993 running cycle of the Stanford Linear Collider, electron spin polarization measurements with a Moller polarimeter at the end of the linac and a Compton polarimeter near the interaction point (IP) indicated a relative polarization loss of up to 20% across the arc. The authors present calculations of the depolarizing effects where variations in energy, energy spread and transverse emittance as well as changes in orbit and initial spin orientation are taken into account. They compare their results with measurements and conclude that, in standard operating conditions, the relative polarization loss is only 3±2%.

8307 (SLAC-PUB–6604) **Over-compression, a method to shape the longitudinal bunch distribution for a reduced energy spread.** Decker, F.J.; Holtzapple, R.; Raubenheimer, T. Stanford Linear Accelerator Center, Menlo Park, CA (United States). Jul 1994. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-9408125–46: 17. international LINAC conference, Tsukuba (Japan), 21-26 Aug 1994). Order Number DE95006052. Source: OSTI; NTIS; INIS; GPO Dep.

In the Stanford Linear Collider the energy spread of the bunches at the end of the linac is dominated by longitudinal wakefields. A short, high current bunch with a Gaussian shape will produce a double-horned energy distribution. It can be shown that certain charge distributions with a sharp rise time (about rectangular or half-Gaussian) will give no additional energy spread due to the linac, since the generated wakefield and the rf-curvature cancel each other exactly. In this paper different methods are presented on how to achieve such distributions by using non-linear dependences in the RTL (Ring-To-Linac) compression region. A simple and effective method to achieve such a distribution is by over-compression. When not fully compressing the bunch, there are two settings of the compressor voltage, under and over-compression, which give the same core bunch length in the linac. By switching from the under to the over-compressed setting, the tails are reduced from more than Gaussian to less than Gaussian beam tails. This results in a roughly rectangular shape which will give the wakefield-rf cancellation. Simulations, measurements and their implications are discussed.

8308 (SLAC-PUB–6621) **Tutorial on beam-based feedback systems for linacs.** Hendrickson, L.; Allison, S.; Gromme, T.; Grossberg, P.; Himel, T.; Krauter, K.; MacKenzie, R.; Ross, M.; Sass, R.; Shoaee, H. Stanford Linear Accelerator Center, Menlo Park, CA (United States). Aug 1994. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-9408125–48: 17. international LINAC conference, Tsukuba (Japan), 21-26 Aug 1994). Order Number DE95006054. Source: OSTI; NTIS; INIS; GPO Dep.

A generalized fast feedback system stabilizes beams in the SLC. It performs measurements and modifies actuator settings to control beam states such as position, angle, energy and intensity on a pulse to pulse basis. An adaptive cascade feature allows communication between a series of linac loops, avoiding overcorrection problems. The system is based on the state space formalism of digital control theory. Due to the database-driven design, new loops are added without requiring software modifications. Recent enhancements support the monitoring and control of nonlinear states such as beam phase using excitation techniques. In over three years of operation, the feedback system has grown from its original eight loops to more than fifty loops, and it has been invaluable in stabilizing the machine.

4303 Auxiliaries and Components

Refer also to citation(s) 7264, 7322, 8270, 8298, 8302, 8332, 8333, 8340, 8370, 8415, 8686, 8776, 8860, 8916, 8929, 8965, 8981

8309 (ANL/MSD/CP–82826) **Cryogenic monochromator as a solution to undulator heat loads at third generation synchrotron sources.** Knapp, G.S.; Rogers, C.S.; Beno, M.A.; Jennings, G.; Cowan, P.L. Argonne National Lab., IL (United States). Oct 1994. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-940714–46: International meeting on synchrotron radiation instrumentation, Stony Brook, NY (United States), 18-22 Jul 1994). Order Number DE95004647. Source: OSTI; NTIS; INIS; GPO Dep.

We have developed a new design for a cryogenically cooled monochromator employing a thin-crystal strategy which is capable of handling the central-cone power of the Advanced Photon Source's Undulator A at closed gap and at the full design current of 300 mA. We have designed and fabricated a Si (111) crystal which has a thin section where the x-rays hit and has internal cooling channels. A invar manifold has also been designed and it will be attached to the Si via In gaskets. We have done detailed modeling, both with approximate analytical and with finite element calculations. The results shown that our design has negligible thermal strain even for closed gap operation.

8310 (BNL–52435) **Lasers for RF guns: Proceedings.** Srinivasan-Rao, T. (ed.). Brookhaven National Lab., Upton, NY (United States). [1994]. 153p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-9405276–: Lasers for RF guns, Anaheim, CA (United States), 14-15 May 1994). Order Number DE95004856. Source: OSTI; NTIS; INIS; GPO Dep.

In the past decade, laser driven RF guns have matured from a device under development to a proven source for high brightness and low emittance electron beams. The reliability of the electron beam from these sources is dictated by the laser system that drives it. In addition, capabilities of the laser systems play a vital

role in the design of the electron source for future machines such as the TESLA and NLC. The purpose of this workshop was to provide a forum for discussing the design criteria for the laser systems so that the reliability of the existing sources could be improved and the future machines could be serviced. The Workshop brought together experts in RF Guns, accelerators, and lasers, from both the commercial and academic community. Most of the presentations, discussions and conclusions at the workshop are included in these proceedings. The contents are divided into three sections, Section I contains the invited talks that outline the requirements of the RF Guns and the capabilities of the laser systems to meet these requirements. Section II includes most of the papers presented in the poster session. These papers describe various laser systems used with electron guns, schemes to modify the laser beam profile to optimize the electron bunch, and computer simulations of electron trajectories. Section III contains the summaries of the working groups. As the summary section indicates, with sufficient feed back systems, the electron gun could be made to operate reliably with minimum downtime, using commercial lasers currently available. The design of laser systems for future colliders depend critically on the choice of the cathode m the gun and its efficiency. Tentative designs of laser systems for the TESLA test facility and LCLS had been drawn assuming a copper cathode. Using a more efficient cathode will ease the energy requirement of the laser and simplify the design. The individual papers have been cataloged separately elsewhere.

8311 (BNL–61019) **NSLS control system upgrade.** Smith, J.D.; Ramamoorthy, S.; Tang, Yong N. Brookhaven National Lab., Upton, NY (United States). [1995]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-931023–13: ICALEPCS'93: International conference on accelerators and large experimental physics control systems, Berlin (Germany), 18-22 Oct 1993). Order Number DE95003949. Source: OSTI; NTIS; INIS; GPO Dep.

The NSLS consists of two storage rings, a booster and a linac. A major upgrade of the control system (installed in 1978) was undertaken and has been completed. The computer architecture is being changed from a three level star-network to a two level distributed system. The microprocessor subsystem, host computer and workstations, communication link and the main software components are being upgraded or replaced. Since the NSLS rings operate twenty four hours a day a year with minimum maintenance time, the key requirement during the upgrade phase is a non-disruptive transition with minimum downtime. Concurrent with the upgrade, some immediate improvements were required. This paper describes the various components of the upgraded system and outlines the future plans.

8312 (BNL–61053) **Operation of a small-gap undulator on the NSLS X-ray Ring.** Stefan, P.M.; Krinsky, S.; Rakowsky, G.; Solomon, L. Brookhaven National Lab., Upton, NY (United States). [1995]. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-950261–1: Contribution for Halbach Festschrift, Berkeley, CA (United States), 3 Feb 1995). Order Number DE95004841. Source: OSTI; NTIS; INIS; GPO Dep.

We report results of an on-going experiment being carried out in the X13 straight section of the NSLS X-ray Ring which explores the limits of the operation of small-gap undulators. In particular, we discuss the operation of a 16 mm period small-gap undulator. At an electron beam current of 300 mA the variable gap vacuum chamber has been closed to an inner aperture of 3.8 mm with no effect on the electron beam lifetime. Measurements of the output radiation spectrum at a magnet gap of 7.5 mm are described.

8313 (DOE/ER/40150–281) **Superharp: A wire scanner with absolute position readout for beam energy measurement at CEBAF.** Yan, C. Southeastern Universities Research Association, Inc., Newport News, VA (United States). Continuous Electron Beam Accelerator Facility. 7 Sep 1994. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84ER40150. (CEBAF-R–94-002). Order Number DE95005905. Source: OSTI; NTIS; INIS; GPO Dep.

Superharp is an upgrade CEBAF wire scanner with absolute position readout from shaft encoder. As high precision absolute beam position probe ($\Delta x \sim 10\mu m$), three pairs of superharps are installed at the entrance, the mid-point, and the exit of Hall C arc beamline in beam switch yard, which will be tuned in dispersive mode as energy spectrometer performing 10^{-3} beam energy measurement. With dual sensor system: the direct current pickup and the bremsstrahlung detection electronics, beam profile can be obtained by superharp at wide beam current range from 1 μA to 100 μA.

8314 (IFVE-OMVT–92-123) **Algorithm for model-based diagnosis of the beam line.** Ukhov, V.I. Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov (Russian Federation). Inst. Fiziki Vysokikh Ehnergij. 1992. 15p. (In Russian). Order Number DE95612752. Source: OSTI; NTIS (US Sales Only); INIS.

An algorithm based on the model of derivative matrix for the functional diagnosis of linear magneto-optical structures (MOS) is described. The algorithm uses artificial intelligence elements and is designed to operate in the operator time scale. The algorithm described is realized as a module in the program for tuning and diagnosis of linear MOS. The parameters of the U-70 accelerator beam extraction system are included into one of the models. 8 refs.; 4 figs.

8315 (INIS-mf–13801, pp. NAT9) **PIXE analysis setup using a proton in air beam facility at the ININ.** Fernandez, M. (Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico)); Policroniades, R.; Jimenez, F.; Murillo, G.; Moreno, E. Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico); Instituto de Investigaciones Electricas, Cuernavaca (Mexico); Universidad Autonoma del Estado de Morelos (UAEM), Cuernavaca (Mexico). 1992. 30p. (CONF-9208272–: 9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry, Cuernavaca (Mexico), 16-21 Aug 1992). In *9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry. Abstracts.* Order Number DE95611878. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. PIXE ANALYSIS/accelerators; FOILS; LI-DRIFTED SI DETECTORS; MEXICAN ORGANIZATIONS; MULTI-ELEMENT ANALYSIS; ACCELERATORS; PULSE CIRCUITS; SAMPLING; TEST FACILITIES; VACUUM SYSTEMS

8316 (INIS-mf–14440, pp. 8) **Cross-over electron beam ion sources.** Fallah Shirazi, A. Iranian Physics Society, Teheran (Iran, Islamic Republic of); Frankfurt Univ. (Germany). Aug 1994. 91p. (In English, Persian). (CONF-9408203–: Annual physics conference of Iran, Sanandaj (Iran, Islamic Republic of), 19 Aug - 1 sep 1994). In *Abstracts of annual physics conference of Iran, 1373 Kordestan University.* Order Number DE95611717. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. ELECTRON BEAM ION SOURCES; CURRENT DENSITY; ELECTRON BEAMS; MICRO AMP BEAM CURRENTS; PARTICLE KINEMATICS

8317 (INIS-mf–14452) **Study of the Reflex-Klystron.** Valencia A, R. Instituto Politecnico Nacional, Mexico City (Mexico). Escuela Superior de Ingenieria Mecanica y Electrica. 1981. 84p. (In Spanish). Order Number DE95615824. Source: OSTI; NTIS (US Sales Only); INIS.

The main purpose of this paper is the theoretical study and the development of a technique for designing. A low power Reflex-Klystron, in order to construct it in the graduated section laboratories of the Instituto Politecnico Nacional. It is pretended to attain a power of 15-45 m W in frequencies of 8-10 GHz with low acceleration potentials (300-400 V) and electric current of 15-25 m A; the device will be mechanically tuned and will have a fine tuning through the potential of the reflector (150-180 V negative with respect to the resonator). The International System of Units is used in this thesis. (Author).

8318 (INIS-RU–357, pp. 46-50) **Status of the project on ν-detection.** Flegel, W. Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov (Russian Federation). Inst. Fiziki Vysokikh Ehnergij. 1991. (CONF-9009329–: Workshop on physics at UNK, Protvino (USSR), 25-28 Sep 1990). In *Third workshop 'Physics at UNK' (Proceedings).* 269p. Order Number DE94607646. Source: OSTI; NTIS (US Sales Only); INIS.

A 3 TeV beam dump experiment on ν_τ-detection to be performed at UNK is described. Status and development of an active target detector are given. 3 refs.

8319 (JINR-D–15-93-80, pp. 32-36) **Microtron as an injector into an electron synchrotron.** Catana, D.; Panaitescu, I.; Axinescu, S.; Minea, R. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1993. 119p. (CONF-9209490–: Workshop on application of microtrons in nuclear physics, Plovdiv (Bulgaria), 22-24 Sep 1992). In *Microtron MT-25. Workshop on application of microtrons in nuclear physics.* Order Number DE95611718. Source: OSTI; NTIS (US Sales Only); INIS.

A preliminary proposal to build a synchrotron radiation source at the Institute of Atomic Physics, Bucharest, Romania is considered. The electron energy is about 200-300 MeV, corresponding to a cut-off wavelength of several hundred angstroms. A comparison with other radiation sources in the same wavelength range is presented. The 17-orbit microtron, now in operation, will be used as injector. The microtron parameters are presented. 4 refs.

8320 (JINR-D–15-93-80, pp. 37-39) **The 17-orbit microtron from the Institute of Atomic Physics, Bucharest.** Catana, D.; Axinescu, S.; Minea, R. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1993. 119p. (CONF-9209490–: Workshop on application of microtrons in nuclear physics, Plovdiv (Bulgaria), 22-24 Sep 1992). In *Microtron MT-25. Workshop on application of microtrons in nuclear physics.* Order Number DE95611718. Source: OSTI; NTIS (US Sales Only); INIS.

The description of the 17-orbit microtron which is in operation from 1977 at the Institute of Atomic Physics, Bucharest is given. The fields of its application are considered.

8321 (JINR-D–15-93-80, pp. 40-46) **Automatized working place of the microtron MT-25 operator.** Ivanov, V.G. (Joint Inst. for Nuclear Research, Dubna (Russian Federation)); Fernandes Nodarse, F.; Belov, A.G.; Sun'ga, Kh. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1993. 119p. (In Russian). (CONF-9209490–: Workshop on application of microtrons in nuclear physics, Plovdiv (Bulgaria), 22-24 Sep 1992). In *Microtron MT-25. Workshop on application of microtrons in nuclear physics.* Order Number DE95611718. Source: OSTI; NTIS (US Sales Only); INIS.

To reduce training time and to improve operating personnel efficiency, a decision was made to develop an automated workstation of MT-25 microtron operator which will be based on a microcomputer compatible with IBM PC XT/AT, 640 kB RAM, graphic display of an average resolution, Winchester HDD, DOS 3.3. The computer aid which is designed on the basis of the automated workstation and MT-25 microtron is primarily intended for symbolic processes and euristic retrival and features simplicity in updating, changing and expanding. Its application will, probably, enable correct, as a rule, answers, and the system will become a useful supporting or consultative facility for the users of MT-25 microtron workstation. 5 refs., 3 figs.

8322 (JINR-E–9-94-236) **On a Possibility to Construct High-Intensity Monochromatic Gamma-Source at HERA and LEP.** Saldin, E.L. (Automatic Systems Corporation, Samara (Russian Federation)); Shnejdmiller, E.A.; Ul'yanov, Yu.N.; Sarantsev, V.P.; Shimanskij, S.S.; Yurkov, M.V. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1994. 12p. Order Number DE95612760. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Nuclear Instruments and Methods in Physics Research. Section A, Accelerators, Spectrometers, Detectors and Associated Equipment.

A possibility to construct high-intensity tunable monochromatic γ-source at HERA and LEP (LEP-2) is discussed. It is proposed to produce γ-quanta by means of Compton backscattering of laser photons on electrons of the collider. The laser light wavelength is chosen in such a way that after the scattering, the electron does not leave the separatrix. So as the probability of the scattering is rather small, energy oscillations are damped prior the next scattering. As a result, the proposed source can operate in 'parasitic' mode not interfering with the main mode of the collider operation. It is proposed to install at the colliders HERA and LEP tunable free-electron lasers operating at 100-400 μm wavelength band with the peak and average output power $\approx$ 10 MW and $\approx$ 1 kw, respectively. It will result in the intensity of the γ-source $\approx 10^{14}$ s^{-1} with tunable γ-quantum energy up to 150 MeV, 250 MeV and 500 MeV for the HERA, LEP and LEP 2, respectively. Such a γ-quantum source will reveal unique possibilities for precision investigations in nuclear physics. 22 refs., 3 figs., 2 tabs.

8323 (JINR-E–9-94-255) **Computer Simulation of Accelerator Beam Extraction with a Bent Crystal.** Taratin, A.M. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of High Energy. 1994. 16p. Order Number DE95612753. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Nuclear Instruments and Mehthods.

The extraction of a 120 GeV proton beam from the SPS with transverse particle diffusion onto a bent crystal deflector has been considered with computer simulation. The asymmetry of extraction efficiency with the crystal orientation relative to the beam direction was observed. It was shown that the crystal deformation in the vertical plane led to a considerable broadening of orientational dependence and also a broadening of the extracted beam and its split. (author). 9 refs.; 11 figs.; 1 tab.

8324 (JINR-R–13-94-213) **Highly Efficient Surface Ionisation Ion Source for Ultra-Trace Detection of Quantities of Radio Toxic Strontium Isotopes.** Yushkevich, Yu.V. (Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems); Bystrov, V.A.; Novgorodov, A.F.; Zimmer, K.; Kluge, H.Yu.; Otten, E.W.; Wendt, K.; Beyer, G.; Trautmann, N. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems. 1994. 10p. (In Russian). Order Number DE95612745. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Nuclear Instruments and Methods.

The aim of the present work was development of a highly efficient surface ionisation ion source for alkaline-earth elements. An ionisation efficiency of strontium up to 60% with a sample of 10^{17} atoms ($\simeq$ 10 mg) and separation time about two hours was reached by means of electron bombardment. The main purpose of this ion source is detection of 10^7 atoms of ^{90}Sr (7mBg) in the presence of a surplus of up to 10^{17} stable strontium atoms. The ion source is used in combination with the fast running atom beam recharge system at the RISIKO facility (Mainz, DE). (author). 5 refs.; 6 figs.; 2 tabs.

8325 (KAERI/RR–1282/93) **A study on the proton beam energy measurement and diagnosis.** Chae, Jong Seo (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Lee, Dong Hoon; Kim, Yoo Seok; Ha, Jang Ho; Park, Chan Won; Lee, Yong Min; Hong, Seong Seok; Lee, Ji Seop; Lee, Min Yong. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Dec 1993. 30p. (In Korean). Order Number DE95612754. Source: OSTI; NTIS; INIS.

The main purpose of this project is the measurement of proton beam energy of extraction at RF 25.89 MHz from MC-50 cyclotron, SF type and constructed by Scantronix Co.. Our beam facility can accelerate not only proton, deuteron, helium-3, and alpha particles but also variable energies of each particles. There are three kinds of beam energy measurement method. One of them is the measurement using by magnet (dipole), which is generally used. But our experimental environment give some problems of space for magnet installation and budget. Another method is the measurement by beam stopping range. If the range is measured, then we can reduce the beam energy from measuring range by refering other experimental data and theoretically calculated data. But resolution of this method is poor in general. So the last method is well fit for our case. This method is E-ΔE coincidence measurement. Our detection system is consist of NaI (Tl) for energy measurement of scattered beam from target, and thin plastic sintillation detector for ΔE measurement. Such method gives us the possibilities of particle identification and rejection of gamma background caused by NaI detector. And the reason of using NaI, sensitive gamma rays, is the good linearity of proton beam energy, from 30 MeV to 60 MeV, and light yield of detector, which reported by Romero et al.. We want to give some emphasis on CAMAC data-acquisition system used for two-dimensional data-taking system on real time. Such two dimensional data are required on the identification analysis of scattered particles and selection of proton efficiently.

8326 (SLAC-PUB–95-6745) **Radiation and radiation reaction in continuous focusing channels.** Huang, Zhirong; Chen, Pisin; Ruth, R.D. Stanford Linear Accelerator Center, Menlo Park, CA (United States). [1994]. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-940681–7: Advanced accelerator concepts workshop, Lake Geneva, WI (United States), 13-18 Jun 1994). Order Number DE95006212. Source: OSTI; NTIS; INIS; GPO Dep.

We show that the radiation damping rate of the transverse action of a particle in a straight, continuous focusing system is independent of the particle energy, and that no quantum excitation is induced. This absolute damping effect leads to the existence of a transverse ground state which the particle inevitably decays to, and yields the minimum beam emittance that one can ever attain, $\gamma\epsilon_{min} = \hbar/2mc$, limited only by the uncertainty principle. Due to adiabatic invariance, the particle can be accelerated along the focusing channel in its ground state without any radiation energy loss. These findings may apply to bent systems provided that the focusing field dominates over the bending field.

8327 (SLAC-PUB–6566) **PEP-II vacuum system - joining SS flanges to copper beam chambers.** Fetzko, S.; Hoyt, E.; Cummings, U. Stanford Linear Accelerator Center, Menlo Park, CA (United States). Jun 1994. 3p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-940618–114: 4. European particle accelerator conference, London (United Kingdom), 27 Jun - 1 jul 1994). Order Number DE95006093. Source: OSTI; NTIS; INIS; GPO Dep.

Various methods of joining stainless steel flanges to the copper PEP-II high-energy ring vacuum chambers was investigated with regard to metallurgical soundness, reliability, complexity, and cost. The most promising method appears to be direct electron-beam welding.

8328 (SLAC-PUB–6617) **High gradient tests of SLAC Linear Collider Accelerator Structures.** Wang, J.W. (and others); Deruyter, H.; Eichner, J.; Fant, K.H.; Hoag, H.A.; Koontz, R.F.; Lavine, T.; Loew, G.A.; Loewen, R.; Menegat, L. Stanford Linear Accelerator Center, Menlo Park, CA (United States). Aug 1994. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-9408125–47: 17. international LINAC conference, Tsukuba (Japan), 21-26 Aug 1994). Order Number DE95006053. Source: OSTI; NTIS; INIS; GPO Dep.

This paper describes the current SLAC R&D program to develop room temperature accelerator structures for the Next Linear Collider (NLC). The structures are designed to operate at 11.4 GHz at an accelerating gradient in the range of 50 to 100 MV/m. In the past year a 26 cm constant-impedance traveling-wave section, a 75 cm constant-impedance traveling-wave section, and a 1.8 m traveling-wave section with detuned deflecting modes have been high-power tested. The paper presents a brief description of the RF test setup, the design and manufacturing details of the structures, and a discussion of test results including field emission, RF processing, dark current spectrum and RF breakdown.

8329 (SLAC-PUB–6694) **Polarization at SLAC.** Woods, M. Stanford Linear Accelerator Center, Menlo Park, CA (United States). Jan 1995. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-9409103–13: International symposia on high energy spin physics and polarization phenomena in nuclear physics, Bloomington, IN (United States), 15-22 Sep 1994). Order Number DE95006214. Source: OSTI; NTIS; INIS; GPO Dep.

A highly polarized electron beam is a key feature. for the Current physics program at SLAC. An electron beam polarization of 80% can now be routinely achieved for typically 5000 hours of machine operation per year. Two main Physics programs utilize the polarized beam. Fixed target experiments in End Station A study the collision of polarized electrons with polarized nuclear targets to elucidate the spin structure of the nucleon and to provide an important test of QCD. Using the SLAC Linear Collider, collisions of polarized electrons with unpolarized positrons allow precise measurements of parity violation in the Z-fermion couplings and provide a very precise measurement of tile weak mixing angle. This paper discusses polarized beam operation at SLAC, and gives an overview of the polarized physics program.

8330 (SLAC-PUB–6702) **Review of the SLAC and Les Houches workshops.** Prescott, C.Y. Stanford Linear Accelerator Center, Menlo Park, CA (United States). Dec 1994. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-9409103–10: International symposia on high energy spin physics and polarization phenomena in nuclear physics, Bloomington, IN (United States), 15-22 Sep 1994). Order Number DE95006069. Source: OSTI; NTIS; INIS; GPO Dep.

Polarized Electron Source workshops have been held at varying intervals, beginning in 1983 when Charles Sinclair convened the first at SLAC. Since that time, three workshops were held in conjunction with the International Spin Symposia and two at other occasions. The increasing importance of polarized electron beams at accelerators has stimulated interest in these workshops. Two workshops have been held since the last International Spin Symposium in Nagoya. In 1993, a workshop was held at SLAC, and in 1994 at Les Houches, a polarized electron beam session was held as part of a polarized beam and targets workshop. This report summarizes highlights from the latter two workshops.

8331 (UM-P–94/92) **The use of a CCD imaging system for X-ray film intensity measurement.** Grigg, M.W.; Barnea, Z. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 12p. Sponsored by Australian Research Council, Canberra, ACT (Australia). Order Number DE95615825. Source: OSTI; NTIS (US Sales Only); INIS.

The use of a simple CCD-based imaging system for digitizing and x-ray film image is demonstrated. A method of extending the region of linear response of the film based upon an analytic representation of the observed response to a series of increasing exposures is described. The validity of the procedure is illustrated through an example of the absolute intensity measurement of a reflection of cadmium sulphide. 3 refs., 7 figs.

4304 Storage Rings

Refer also to citation(s) 8340

8332 (ANL/XFD/CP–82917) **X-ray photoelectron spectroscopy analysis of cleaning procedures for synchrotron radiation beamline materials at the Advanced Photon Source.** Li, Y. (Argonne National Lab., IL (United States). Advanced Photon Source); Ryding, D.; Liu, C.; Kuzay, T.M.; McDowell, M.W.; Rosenberg, R.A. Argonne National Lab., IL (United States). [1994]. 17p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-941001–9: 41. annual American Vacuum Society symposium, Denver, CO (United States), 24-28 Oct 1994). Order Number DE95004656. Source: OSTI; NTIS; INIS; GPO Dep.

TZM (a high temperature molybdenum alloy), machinable tungsten, and 304 stainless steel were cleaned using environmentally safe, commercially available cleaning detergents. The surface cleanliness was evaluated by x-ray photoelectron spectroscopy (XPS). It was found that a simple alkaline detergent is very effective at removal of organic and inorganic surface contaminants or foreign particle residue from machining processes. The detergent can be used with ultrasonic agitation at 140 F to clean the TZM molybdenum, machinable tungsten, and 304 stainless steel. A citric-acid-based detergent was also found to be effective at cleaning metal oxides, such as iron oxide, molybdenum oxide, as well as tungsten oxides at mild temperatures with ultrasonic agitation, and it can be used to replace strong inorganic acids to improve cleaning safety and minimize waste disposal and other environmental problems. The efficiency of removing the metal oxides depends on both cleaning temperature and time.

8333 (BNL–61082) **Photon stimulated desorption (PSD) measurements of extruded copper and of welded copper beam chambers for the PEP II asymmetric B-factory.** Foerster, C.L. (Brookhaven National Lab., Upton, NY (United States). NSLS); Lanni, C.; Perkins, C.; Calderon, M.; Barletta, W. Brookhaven National Lab., Upton, NY (United States). [1994]. 15p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-941001–10: 41. annual American Vacuum

Society symposium, Denver, CO (United States), 24-28 Oct 1994). Order Number DE95004842. Source: OSTI; NTIS; INIS; GPO Dep.

PEP II is being built as a higher luminosity electron-positron collider, with asymmetric beams of 9 GeV and 3.1 GeV, having maximum currents of 3.0 A. Based on the previous work on the NSLS VUV beamline U10B, a copper was selected for construction of UHV beam chambers and absorbers to minimize the pressure rise from synchrotron radiation during operation. An extruded beam chamber and a welded beam chamber were fabricated from the selected copper for PSD measurements on NSLS X-ray beamline X28A. The chambers were exposed to white light with a critical energy of 5 KeV, both direct and through a 0.010 inch thick Beryllium filter. Each chamber was exposed to a dose of approximately 10^{23} photons per meter at an incidence angle of 25 mrad, after argon glow conditioning and a 150 C vacuum bake. Desorption yields for H_2 CO, CO_2, and CH_4 are reported as a function of accumulated photon flux, critical energy, and chamber preparation. The results are compared with the previous work on beamline U10B and with those of other published work for copper.

8334 (CERN–94-01(v.2), pp. 717-730) **Vacuum system design.** Mathewson, A.G. (CERN, Geneva (Switzerland)). European Organization for Nuclear Research, Geneva (Switzerland). 26 Jan 1994. 537p. (CONF-9209485–: Course on general accelerator physics, Jyvaeskylae (Finland), 7-18 Sep 1992). In *CAS CERN accelerator school: 5. general accelerator physics course. Vol. 2. Proceedings.* Order Number DE95608324. Source: OSTI; NTIS (US Sales Only); INIS.

In this paper the basic terms used by the vacuum engineer are presented and some useful formulae are also given. The concept of bakeout is introduced and the physics behind it explained. We concentrate on the effects in electron and proton storage rings which are due to energetic particle bombardment of the vacuum system walls and the ensuing gas desorption which may detrimentally affect the running of the machine. In addition, the problems associated with proton storage rings where the vacuum chamber is at cryogenic temperature are described.

8335 (LBL–35912) **Advanced Light Source: Activity report 1993.** Lawrence Berkeley Lab., CA (United States); Princeton Univ., NJ (United States). Plasma Physics Lab. Nov 1994. 71p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00098 ; AC02-76CH03073. Order Number DE95006718. Source: OSTI; NTIS; INIS; GPO Dep.

The Advanced Light Source (ALS) produces the world's brightest light in the ultraviolet and soft x-ray regions of the spectrum. The first low-energy third-generation synchrotron source in the world, the ALS provides unprecedented opportunities for research in science and technology not possible anywhere else. This year marked the beginning of operations and the start of the user research program at the ALS, which has already produced numerous high quality results. A national user facility located at Lawrence Berkeley Laboratory of the University of California, the ALS is available to researchers from academia, industry, and government laboratories. This report contains the following: (1) director's message; (2) operations overview; (3) user program; (4) users' executive committee; (5) industrial outreach; (6) accelerator operations; (7) beamline control system; (8) insertion devices; (9) experimental systems; (10) beamline engineering; (11) first results from user beamlines; (12) beamlines for 1994–1995; (13) special events; (14) publications; (15) advisory panels; and (16) ALS staff.

44 INSTRUMENTATION

8336 (KAERI/RR–1340/93) **The establishment of master plan for developing advanced I and C technology -The development of advanced instrumentation and control technology-.** Ham, Chang Shik (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Lee, Byung Sun; Kwon, Kee Choon; Lee, Dong Young; Hwang, In Koo; Lee, Jang Soo; Kim, Jung Soo; Kim, Chang Hwoi; Jung, Chul Hwan; Na, Nan Ju; Dong, In Sook; Kang, Soon Gu; Lyu, CKorea Cancer Center Hospital, Seoul (Korea, Republic of). Jul 1994. 392p. (In Korean). Order Number DE95612956. Source: OSTI; NTIS; INIS.

Although several organizations are performing their tasks making efforts to develop new digital technology for application to existing nuclear power plants as well as new plants of the future, their projects are similar to each other and have possibilities of redundant investment. Therefore, KAERI have established a Master Plan to define the suitable work-scope of each Instrumentation and Control (I and C) development project and proceed its development items continuously. Furthermore, in the project, several kinds of advanced technology for application of computer science and digital electronics were studied to obtain better reliability of the I and C systems and reduce opertor's burden. For establishing the Master Plan, functions of I and C system of NPPs were surveyed. Especially EPRI URD was deeply analyzed for setting up a basis of the foreign countries were referred for the Master Plan. For the new technology survey, fault-tolerant control technology and control system performance analysis methods were studied. Requirements of alarm and information system as well as technology of I and C network system of NPPs were also established to introduce the advantages of commercial distributed control system. (Author).

8337 (KAERI/RR–1341/93) **The construction of environments for development of test and verification technology -The development of advanced instrumentation and control technology-.** Kwon, Kee Choon (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Ham, Chang Shick; Lee, Byung Sun; Kim, Jung Taek; Park, Won Man; Park, Jae Chang; Kim, Jae Hee; Lee, Chang Soo. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jul 1994. 322p. (In Korean). Order Number DE95612957. Source: OSTI; NTIS; INIS.

Several problems were identified in digitalizing the I and C systems of NPPs. A scheme is divided into hardware and software to resolve these problems. Hardware verification and validation analyzed about common mode failure, commercial grade dedication process, electromagnetic competibility. We have reviewed codes and standards to be a consensus criteria among vendor, licenser. Then we have described the software licensing procedures under 10 CFR 50 and 10 CFR 52 in the United States Nuclear Regulatory Commision (NRC) and presented vendor's approaches to scope with the licensing barrier. At last, we have surveyed the technical issues related to developing and licensing the high integrity software for digital I and C systems. (Author).

4401 Radiation Instrumentation

Refer also to citation(s) 8325, 8431, 8459, 8469, 8593, 8779, 8780, 8781, 8782, 8915, 8947, 9166

8338 (ANL-HEP-CP–94-75) **A review of high energy polarimetry, with a view toward RHIC.** Underwood, D.G. Argonne National Lab., IL (United States). [1995]. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9409103–11: International symposia on high energy spin physics and polarization phenomena in nuclear physics, Bloomington, IN (United States), 15-22 Sep 1994). Order Number DE95004593. Source: OSTI; NTIS; INIS; GPO Dep.

The author presents four physics processes that have measured asymmetries at high energy. Some problems and some advantages of utilizing each in a polarimeter are discussed. For each he gives references to examples of experimental setup and data.

8339 (ANL-HEP-CP–94-78) **The STAR EM calorimeter design and small prototype test results.** Underwood, D.G. Argonne National Lab., IL (United States). [1995]. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9409268–3: 5. international conference on calorimetry in high energy physics, Upton, NY (United States), 25 Sep - 1 oct 1994). Order Number DE95004592. Source: OSTI; NTIS; INIS; GPO Dep.

The basis for several design features of The STAR Electromagnetic Calorimeter and Shower Maximum Detector is presented. This includes some of the tile-fiber optical design. The authors describe both the barrel and the end cap. Some preliminary analysis of electron acceptance vs pion rejection in test beam data is also discussed.

8340 (ANL-HEP-TR-94-42) **Thermal effects on the STAR electromagnetic calorimeter.** Fornek, T. (Argonne National Lab., IL (United States). High Energy Physics Div.); Guarino, V.; Spinka, H.; Underwood, D. Argonne National Lab., IL (United States). 19 Jul 1994. 38p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. Order Number DE95004663. Source: OSTI; NTIS; INIS; GPO Dep.

The STAR detector for the RHIC colliding beam accelerator is under construction at Brookhaven National Laboratory. This detector will consist of a number of subsystems. These include a silicon vertex detector (SVT) for charged particle tracks near the interaction region, a time projection chamber (TPC) for charged particle tracking, an array of plastic scintillation counters (CTB) in a layer around the TPC for triggering on charged particles, a conventional solenoidal magnet, and some additional small triggering detectors along the beam-line. An electromagnetic calorimeter (EMC) is an upgrade to the "baseline" detector configuration above. The conventional magnet and numerous electronic channels for the SVT and TPC subsystems will generate a considerable amount of heat during the operation of STAR. However, it is possible that a chiller for the magnet cooling water will not be available during some of the early STAR runs. As a result, the average magnet temperature may vary considerably between winter and summer. This note summarizes calculations and measurements performed to evaluate the effects of an elevated magnet temperature on the performance of the electromagnetic calorimeter.

8341 (ANL-HEP-TR-94-87) **Support girder design for the atlas hadron calorimeter.** Hill, N.F.; Guarino, V.J.; Petereit, E. Argonne National Lab., IL (United States). 16 Nov 1994. 14p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. Order Number DE95004638. Source: OSTI; NTIS; INIS; GPO Dep.

The girder is the primary structural element of the Hadron Calorimeter. It provides the backbone of the Tile-Cal module and the basic construction reference for the assembly of the module. The girder also forms the outer radius support ring, when the individual modules are assembled into the barrel and the extended barrel assemblies. The girder also serves as the primary flux return path for the solenoidal coil, and as a magnetic shield around the photomultiplier tubes and the electronics to prevent their being affected by stray fields created by the muon toroid. It should be noted that the amount of steel in the girder is dominated by the flux return requirement, and not by the structural requirement. The orientation of the individual components of the girder are demanded by the need to contain the PMT and electronics drawer which resides inside the box structure.

8342 (CNIC–00777) **The calibration facilities of gamma-ray spectrometer oil logging system.** Zhao Yunlong (Beijing Research Inst. of Uranium Geology (China)); Liu Yuzhang; Duan Wenxian. China Nuclear Information Centre, Beijing, BJ (China). Aug 1993. 15p. (In Chinese). (BRIUG–0013.). Order Number DE95613002. Source: OSTI; NTIS (US Sales Only); INIS.

The construction technology for the calibration facilities of gamma-ray spectrometer oil logging system is introduced. It is referenced to the experience from similar calibration facilities at home and abroad. Facilities consist of 9 models. The effective diameter of each model is 1.5 m and the height is 6 m. Each borehole has U ore zone, Th ore zone, K ore zone, high mixed zone, high mixed thin zone, low mixed zone and barren zone. There are 45 zones in total. Each element model has 6 in, 8.5 in and 12 in of different diameters. The preventing radon migration and complete sealing technology are used for each zone to prevent radon from escaping. The density of models, homogeneity and moisture of radio elements have been measured that gives a complete data for calibration adjusting of the instrument. The sizes of facilities and the concentration of radioactivity are reasonable designed and conformed to the recommendation of IAEA. Parameters are consistent with the parameters of calibration facilities built by Houston University in America. The emanation coefficient of the facilities is lees than 1%. The dry density of filling is 2.12 g/cm^3 and the relative standard deviation is +- 1.9%.

8343 (CNIC–00786) **Study on the large position sensitive detector.** Wan Yude (Academia Sinica, Beijing, BJ (China). Inst. of Atomic Energy); Li Zhongzhen. China Nuclear Information Centre, Beijing, BJ (China). Oct 1993. 8p. (In Chinese). (IAE–0125.). Order Number DE95613069. Source: OSTI; NTIS (US Sales Only); INIS.

A large position sensitive detector, in which the charge division technique is used, with a single wire anode proportional counter is developed. The sensitive area of the detector is 1200 x 60 mm^2. The anode of the detector is NiCr wire with 10 μm in diameter and 12 Ω/mm of its resistance. The cathodes of the detector are single side aluminized Mylar films and the thickness 12.5 μm. The detector works under the condition of flushing the mixed gas of 70% Ar + 30% CH_4 with one atmosphere. In order to test the detector a ^{241}Am alpha source (about 5 MeV) is put on the collimator. The collimator can freely and accurately move along the detector window. Along the direction of anode wire, measurement is performed in the distance of every 6 cm. The total is 19 measuring points. The average intrinsic position resolution (FWHM) is about 0.6 mm, and the integral nonlinearity is better than 0.2%. This detector has been installed on the detector system of Q3D magnetic spectrometer and will be tested on the tandem accelerator with ion beam.

8344 (DOE/MC/29109–3977) **Road Transportable Analytical Laboratory (RTAL) system. Quarterly progress report, February 1994–April 1994.** Engineering Computer Opteconomics, Inc., Annapolis, MD (United States). 15 Dec 1994. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC21-92MC29109. Order Number DE95006218. Source: OSTI; NTIS; INIS; GPO Dep.

Progress on Phase 2 development of the RTAL system during the period February 1 through April 30, 1994 is reported.

8345 (DOE/MC/29109–3978) **Road Transportable Analytical Laboratory (RTAL) system. Quarterly progress report, May 1994–July 1994.** Engineering Computer Opteconomics, Inc., Annapolis, MD (United States). [1994]. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC21-92MC29109. Order Number DE95006217. Source: OSTI; NTIS; INIS; GPO Dep.

Progress achieved on the development of the RTAL system during the quarter, May 1 through July 31, 1994 is reported. The work included NEPA analysis, drawings, prototype system construction, and on-site prototype demonstration.

8346 (FEI–2293) **Choice of cold moderator for the DIN-2PI spectrometer.** Novikov, A.G.; Rogov, A.D. Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk (Russian Federation). Fiziko-Ehnergeticheskij Inst. 1992. 28p. (In Russian). Order Number DE95613003. Source: OSTI; NTIS (US Sales Only); INIS.

The main problems concerning the choice of a cold moderator for the DIN-1PU neutron spectrometer in the neutron beam No.2 of the IBR-2 reactor are considered. It is concluded, that the cold water grooved moderator is the most suitable one under neutron beam No.2 and spectrometer DIN-2PI conditions. 35 refs.; 12 figs.; 1 tab.

8347 (FNAL/C–94/307) **Low-pressure micro-strip gas chamber and a search for a high-efficiency secondary-electron emitter.** Anderson, D.F. (Fermi National Accelerator Lab., Batavia, IL (United States). Particle Detector Group); Kwan, S.; Sbarra, C. Fermi National Accelerator Lab., Batavia, IL (United States). Nov 1994. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH03000. (CONF-941060–1: 4. international conference on advanced technology and particle physics, Como (Italy), 3-7 Oct 1994). Order Number DE95004854. Source: OSTI; NTIS; INIS; GPO Dep.

The test beam performance of a low-pressure micro-strip gas chamber with a thick CsI secondary-electron emitting surface as the source of primary ionization is presented. A study of the secondary-electron yield of CsI and KCl coated surfaces are discussed, as well as a promising new technique, CsI-treated CVD diamond films.

8348 (FNAL/C–94/379-E) **Physics capabilities of the DO upgrade detector.** Ellison, J. (Univ. of California, Riverside, CA (United States). Physics Dept.). Fermi National Accelerator Lab., Batavia, IL (United States). Nov 1994. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH03000. (CONF-9407142–8: ICHEP '94, Glasgow (United Kingdom), 20-27

Jul 1994). Order Number DE95004848. Source: OSTI; NTIS; INIS; GPO Dep.

The D0 detector at Fermilab is being upgraded to meet the demands imposed by high luminosity Tevatron running planned to begin in 1998. The central tracking detectors will be replaced with silicon and scintillating fiber tracking systems inside a solenoidal magnetic field and a preshower detector will be added to aid in electron identification. The design and performance of these systems are described and detailed simulations of the physics capabilities of the upgraded detector are presented. In particular the authors focus on the study of electroweak boson properties and top quark physics and briefly describe the b-physics capabilities.

8349 (GANIL-T–94-01) **1-D and 2-D processing for on-line control and data analysis assistance for the multidetector 4π INDRA.** Benkirane, A. Grand Accelerateur National d'Ions Lourds (GANIL), 14 - Caen (France). Feb 1994. 176p. (In French). Order Number DE95613070. Source: OSTI; NTIS (US Sales Only); INIS.

The first part of the thesis is concerned with the quality control of the detection modules and three analysis methods are studied and compared: spectral analysis, distribution function method and correlation form measurement; implementation of the spectral analysis technique is then described. The second part is concerned with the non controlled identification of the Z lines; an image processing approach is adopted which handles the peak line recognition problem as an edge detection problem. A contextual edge detection system with a-priori knowledge is presented. Examples of implementation and integration are given. 44 figs., 59 refs.

8350 (IA–1486, pp. 125-126) **Study of the long term stability of peak 4 and 5 in the TLD-100 using computerized glow curve deconvolution and thermal peak isolation techniques. Correlation with isothermal decay measurements at elevated temperatures.** Horowitz, Y.S.; Ben-Shachar, B.; Yossian, D. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. THERMOLUMINESCENT DOSEMETERS/spectra unfolding; GLOW CURVE; PEAKS; PULSE RISE TIME; TEMPERATURE DEPENDENCE; TEMPERATURE RANGE 0273-0400 K; TIME MEASUREMENT

8351 (IA–1486, pp. 126) **Radiation Monitor (RAM) I-125.** Ankry, N.; Vulasky, E.; Matmor, A.; Tal, N. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. IODINE 125/radiation monitors; ALARM SYSTEMS; AUTOMATION; BETA DOSIMETRY; CALIBRATION; COMPUTERIZED CONTROL SYSTEMS; DOSEMETERS; EXPOSURE RATEMETERS; MICROPROCESSORS; NAI DETECTORS; OCCUPATIONAL EXPOSURE; ON-LINE MEASUREMENT SYSTEMS; PHOTOMULTIPLIERS; RADIATION PROTECTION; RADIOACTIVITY; THRESHOLD DOSE

8352 (IA–1486, pp. 127) **Radiation Monitor (RAM) ION pressure response instrument.** Ankry, N.; Elgad, D.; Ahharoni, D.; Vulaski, E.; Tal, N. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. DOSEMETERS/pressure dependence; DOSE RATEMETERS; DOSEMETERS; EVALUATION; PERFORMANCE; RADIATION DETECTION; RADIATION DETECTORS; RADIATION DOSES; RADIATION MONITORING; RADIATION MONITORS; TESTING; WINDOWS

8353 (IA–1486, pp. 127-128) **Radiation Monitor (RAM) ION communication with wireless monitoring system.** Ankry, N.; Mazor, T.; Tal, N. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. DOSEMETERS/data transmission systems; COMPUTER CODES; DOSEMETERS; ELECTRONIC EQUIPMENT; EQUIPMENT INTERFACES; RADIO EQUIPMENT; REMOTE SENSING; RF SYSTEMS; SURVEY MONITORS; TELEMETRY

8354 (IA–1486, pp. 128) **The Radiation Monitor (RAM-R) system.** Mazor, T.; Wengrowicz, U.; Tirosh, D.; Vulaski, E.; Duvniz, E.; Ellenbogen, M. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. SELF-POWERED GAMMA DETECTORS/portable equipment; SELF-POWERED GAMMA DETECTORS/telemetry; AERIAL MONITORING; AERIAL SURVEYING; EDUCATION; EDUCATIONAL TOOLS; ELECTRONIC EQUIPMENT; EQUIPMENT INTERFACES; GEIGER-MUELLER COUNTERS; HELICOPTERS; MICROPROCESSORS; MICROWAVE EQUIPMENT; OCCUPATIONAL EXPOSURE; OCCUPATIONAL SAFETY; PACKAGING; PERSONNEL; RADIATION DETECTORS; RADIATION MONITORING; RADIATION PROTECTION; RADIO EQUIPMENT; REMOTE SENSING; TELEMETRY; SURVEY MONITORS; THRESHOLD DETECTORS; THRESHOLD DOSE; TRAINING; TRANSPORT

8355 (IA–1486, pp. 129) **Simulator for the A-SMG 90.** Mazor, T.; Wengrowicz, U.; Ankry, N.; Maiss, E. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. RADIATION MONITORS/simulators; AUSTRIA; EDUCATIONAL TOOLS; ELECTRONIC EQUIPMENT; EQUIPMENT INTERFACES; MILITARY PERSONNEL; PORTABLE EQUIPMENT; SIMULATORS; RADIATION PROTECTION; RADIO EQUIPMENT; REMOTE SENSING; RF SYSTEMS; TRAINING

8356 (IA–1486, pp. 129-130) **RADTEST.** Ellenbogen, M.; Duvnitz, E.; Maiss, E.; Vulaski, E.; Mazor, T. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. ACTIVITY METERS/gamma radiation; ACTIVITY LEVELS; CESIUM; CESIUM IODIDES; COBALT; DISPLAY DEVICES; FEASIBILITY STUDIES; FOOD; GAMMA SPECTROMETERS; IODINE; KEV RANGE 100-1000; LIQUIDS; MAN-MACHINE SYSTEMS; MEV RANGE 01-10; OPTIMIZATION; PORTABLE EQUIPMENT; RADIATION MONITORING; RADIATION MONITORS; SAMPLE PREPARATION; SCINTILLATOR-PHOTODIODE DETECTORS; SOLID SCINTILLATION DETECTORS; WEIGHT

8357 (IA–1486, pp. 130-132) **BANKET - communication network for radiation monitoring devices.** Burstein, O.; Wengroeicz, U.; Tirosh, D. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

A communication network for real-time data collection from radiation monitors was developed. The network allows accurate and rapid data collection, requiring minimal personnel. (authors). 2 refs., 1 fig.

8358 (IA–1486, pp. 133-134) **Housing for on-line radioactive contamination detection unit.** Ellenbogen, E.; Duvnitz, E.; Shemesh, Y.; Assido, H. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. LIQUID CONTAMINATION MONITORS/packaging; CONTAINERS; CONTAINMENT; CONTAMINATION; DESIGN; DOSEMETERS; FLOW RATE; PACKAGING; LIQUID FLOW; RADIATION MONITORING; SAMPLE PREPARATION; SAMPLERS; SAMPLING; SHELLS; SPECIFICATIONS; WEATHERIZATION

8359 (IA–1486, pp. 134-135) **Alpha and beta radioactivity contamination counting system.** Wengrowicz, U.; Tirosh, D.; Piestun, S.; Shemesh, Y.; Assido, H. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research*

laboratories annual report 1993. 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. SURFACE CONTAMINATION MONITORS/counting circuits; ANTICOINCIDENCE; COINCIDENCE CIRCUITS; COMPUTER CODES; COMPUTERS; DOSEMETERS; ELECTRONIC EQUIPMENT; MICROPROCESSORS; PROPORTIONAL COUNTERS; RADIATION MONITORS; SIGNALS

8360 (IA–1486, pp. 135-136) **Training detector as simulator of alpha detector.** Paran, J.; Tirosh, D.; Shmuely, M.; Ronen, Y.; Assido, H. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. ALPHA DETECTION/simulators; SIMULATORS; ALPHA DOSIMETRY; COMPARATOR CIRCUITS; COUNTING CIRCUITS; DIRECTIONAL RADIATION DETECTORS; EDUCATIONAL TOOLS; GEIGER-MUELLER COUNTERS; INTEGRATED CIRCUITS; LOGIC CIRCUITS; PULSE CIRCUITS; PULSE DISCRIMINATORS; SELF-POWERED GAMMA DETECTORS; TECHNETIUM 99; TRAINING

8361 (IA–1486, pp. 136-137) **Detection limits for differential measuring methods for natural uranium.** Pelled, O.; German, U.; Weinstein, M.; Levinson, S.; Shimon, O.; Kol, R.; Naim, E. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. NATURAL URANIUM/sensitivity; ACTIVITY LEVELS; AEROSOL MONITORING; AIR FILTERS; AIR POLLUTION MONITORS; AIR SAMPLERS; COMPARATIVE EVALUATIONS; DISSOLVERS; GAMMA SPECTROSCOPY; GEIGER-MUELLER COUNTERS; ICP MASS SPECTROSCOPY; LASERS; LI-DRIFTED GE DETECTORS; LIQUID SCINTILLATION DETECTORS; NAI DETECTORS; SENSITIVITY; NITRIC ACID; PROPORTIONAL COUNTERS; QUANTITATIVE CHEMICAL ANALYSIS; SAMPLE PREPARATION; SOLUTES

8362 (IA–1486, pp. 138-139) **A quick quantitative evaluation of a specific radio nuclide from 'Nucleus Pulse Spectrum Analysis' spectra.** Levinson, S.; German, U.; Pelled, O.; Weinstein, M.; Naim, E. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. SPECTRA UNFOLDING/computer codes; CALIBRATION STANDARDS; COMPILED DATA; NATURAL URANIUM

8363 (IA–1486, pp. 139-141) **A square 7.5 inch proportional guard detector.** Levinson, S.; Assido, H.; Shemesh, Y.; Piestun, S.; German, U. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

A new version of a square 7.5 inch proportional guard detector was developed. The main difference between the 'old' version, used in a microprocessor-based counting system, and the 'new' one is in the anode wiring, which leads to better performance and easier manufacturing and assembly. Both detector versions are built of PVC coated on the inside with an electricity-conducting spray. The anode consists of nine stainless steel spiral wires of 0.002 inch diameter. The counting gas in both detectors is 90% argon and 10% methane. (authors). 1 ref., 3 figs.

8364 (IA–1486, pp. 141-142) **A manual sample changer for a 5 inch proportional detector counting system.** Levinson, S.; Elbaz, Y.; German, U.; Naim, E. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. MULTIWIRE PROPORTIONAL CHAMBERS/sample changers; BACKGROUND RADIATION; COPPER; EFFICIENCY; LINERS; LOW LEVEL COUNTING; SAMPLE HOLDERS; SAMPLE PREPARATION; SHIELDING

8365 (IA–1486, pp. 158) **Digital stabilizer for multichannel analysis.** Boneh, R.; Gabovitch, A.; Barak, D. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. MULTI-CHANNEL ANALYZERS/stability; COUNTING CIRCUITS; ERRORS; GAMMA DETECTION; GAMMA SPECTRA; STABILITY; RADIATION DETECTORS; SPECTRA UNFOLDING

8366 (IA–1486, pp. 159) **A practical estimation of reliability of Geiger-Mueller tubes.** Paran, J.; Gabay, Y.; Kornfeld, H.; Tirosh, D. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. ALARM SYSTEMS/failure mode analysis; COMPARATIVE EVALUATIONS; CONTROLLED AREAS; GEIGER-MUELLER COUNTERS; OCCUPATIONAL SAFETY; RADIATION MONITORING; RADIATION PROTECTION; RELIABILITY; REMOTE SENSING

8367 (IFVE-OEA–92-109) **Prototype of fronted electronics for tracking detectors with high channel density.** Konoplyannikov, A.K. Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov (Russian Federation). Inst. Fiziki Vysokikh Ehnergij. 1992. 10p. (In Russian). Order Number DE95613071. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to NIM.

A prototype of the fronted electronics for tracking detectors with high channel density is described. A method of channel number compression is used in this apparatus and the number of transmission lines between detectors and fronted electronics is decreased by 8 times. A descriptions of the electronic modules and experimental results are presented. 6 refs.; 8 figs.

8368 (IFVE-OEF–91-127) **Hybrid discriminator for microstrip silicon detectors.** Golovin, V.M.; Kurchaninov, L.L.; Postoev, V.E.; Semenov, P.A.; Shchepillo, V.V. Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov (Russian Federation). Inst. Fiziki Vysokikh Ehnergij. 1991. 10p. (In Russian). Order Number DE95613072. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to the journal 'Pribory i Tekhnika Ehksperimenta'.

The paper describes an efficient fast-response pulse hybrid discriminators developed for microstrip silicon detectors and presents the results of an investigation into basic characteristics of the discriminator. Actuation threshhold dependences on shift voltage, power supply voltage and forming capacity value are given. Actuation time dependences on input signal amplitude are presented. Intrinsic input resistance of the discriminator is 1.2 kOhm, output characteristic transconductance - 0.72 V/mV, output signal front for 0.1-0.9 levels is 2.5 ns. The discriminators's power consumption 6 V x 4 mA. 8 refs., 8 figs.

8369 (IFVE-OEIUNK–92-60) **Cable connection between the detector and low-noise amplifier as an alternative of the radiation-resistant amplifiers.** Krasnokutskij, R.N.; Sushkov, V.V.; Fedyakin, N.N.; Chen, M.; Tsang, Kh.; Shuvalov, R.S. Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov (Russian Federation). Inst. Fiziki Vysokikh Ehnergij. 1992. 19p. (In Russian). Order Number DE95613151. Source: OSTI; NTIS (US Sales Only); INIS.

The paper presents the results of a thorough analysis of noises in case of cable connection between the detector and amplifier. Equivalent noise charge is calculated for different cable lengths, detector capacitance and pulse length. It is ascertained that in case of higher detector capacitances $C \geq 100$ pΦ equivalent noise charge decreases and later on stops depending on cable length. Transistors with threshold frequency of the order of several GHz shall be used to obtain a good signal/noise ratio. 2 refs., 11 figs., 2 tabs.

8370 (IHEP–93-117) **Beam tests of 'Spacal' type modules for a high pressure gas calorimeter.** Konstantinov, V.F. (and others); Krasnokutskij, R.N.; Shuvalov, R.S. Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov (Russian

Federation). Inst. Fiziki Vysokikh Ehnergij. 1993. 19p. Order Number DE95613073. Source: OSTI; NTIS (US Sales Only); INIS.

High-pressure gas modules with cylindrical ionization chambers for a Very Forward Calorimeter (VFC) are constructed and tested in the IHEP U-70 electron beam. The module performance at small angles is tested in the energy range of 10-30 GeV using different gas mixtures like $Ar+CH_4$, $Ar+CF_4$ and pure CF_4 at the pressure of 20-40 atm. The best value of energy resolution reached is 18% at the angle 5.7 deg for 30 GeV electrons. The design is found to be adequate for future use in ATLAS/LHC. 24 refs.; 10 figs.

8371 (INIS-mf–13801, pp. NAT6) **Alpha-particle spectrum of ^{222}Rn and its daughters using silicon surface-barrier detectors.** Iturbe, J.L. (Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico)). Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico); Instituto de Investigaciones Electricas, Cuernavaca (Mexico); Universidad Autonoma del Estado de Morelos (UAEM), Cuernavaca (Mexico). 1992. 30p. (CONF-9208272–: 9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry, Cuernavaca (Mexico), 16-21 Aug 1992). In *9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry. Abstracts.* Order Number DE95611878. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. RADON 222/alpha spectra; DAUGHTER PRODUCTS; DECAY; ELECTROPLATING; MEASURING METHODS; NITRIC ACID; RADIUM 226; SILICON; STAINLESS STEELS

8372 (INIS-mf–13801, pp. NAT7) **Efficiency curve determination of Si (Li) detector.** Aspiazu, J. (Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico)). Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico); Instituto de Investigaciones Electricas, Cuernavaca (Mexico); Universidad Autonoma del Estado de Morelos (UAEM), Cuernavaca (Mexico). 1992. 30p. (CONF-9208272–: 9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry, Cuernavaca (Mexico), 16-21 Aug 1992). In *9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry. Abstracts.* Order Number DE95611878. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. LI-DRIFTED SI DETECTORS/pixe analysis; DIAGRAMS; EFFICIENCY; LAYERS; RUTHERFORD SCATTERING; X-RAY SPECTROSCOPY

8373 (INIS-mf–13801, pp. NAT15) **ESR-TRIS system as a gamma dosimeter.** Azorin, J. (Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico)); Gutierrez, A.; Gonzalez, P. Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico); Instituto de Investigaciones Electricas, Cuernavaca (Mexico); Universidad Autonoma del Estado de Morelos (UAEM), Cuernavaca (Mexico). 1992. 30p. (CONF-9208272–: 9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry, Cuernavaca (Mexico), 16-21 Aug 1992). In *9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry. Abstracts.* Order Number DE95611878. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. GAMMA DOSIMETRY/electron spin resonance; IRRADIATION; METHYLAMINE; RADIATION DOSE UNITS; RADIATION DOSES; RADICALS

8374 (INIS-mf–14440, pp. 8) **Computer simulation and characterization of glow curve in contact heating of thermoluminescent detectors.** Samei, E.; Kearfott, K.J. Iranian Physics Society, Teheran (Iran, Islamic Republic of); Michigan Univ., Ann Arbor, MI (United States). Dept. of Nuclear Engineering. Aug 1994. 91p. (In English, Persian). (CONF-9408203–: Annual physics conference of Iran, Sanandaj (Iran, Islamic Republic of), 19 Aug - 1 sep 1994). In *Abstracts of annual physics conference of Iran, 1373 Kordestan University.* Order Number DE95611717. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. THERMOLUMINESCENT DOSEMETERS/computerized simulation; DEPTH DOSE DISTRIBUTIONS; GLOW CURVE; THERMAL CONDUCTION; THERMOLUMINESCENCE

8375 (JINR–3-66-94) **JINR Rapid Communications. Collection 3.** Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1994. 53p. Order Number DE95615980. Source: OSTI; NTIS (US Sales Only); INIS.

The present collection of rapid communications from JINR, Dubna, contains 5 separate reports concerning Metal Resistive layer Semiconductor Si avalanche detectors with negative feedback for time-of-flight systems, identification of the doubly magic nucleus ^{100} Sn, multimodal fission of neutron-deficient nuclides of Th and Ac, inclusive energy spectra of light charged particles (p, d, t, ^{4}He) from spontaneous fission of ^{248}Cm and nucleon correlation effects on y-scaling quantities in nuclei. 75 refs.; 22 figs.; 3 tabs.

8376 (JINR–3-66-94, pp. 5-10) **MRS Silicon Avalanche Detectors with Negative Feedback for Time-of-Flight Systems.** Afanas'ev, S.V.; Anisimov, Yu.S.; Gotra, Yu.N.; Jejer, V.N.; Kolesnikov, V.I.; Kushpil, V.V.; Malakhov, A.I.; Malakhov, N.A.; Reznikov, S.G.; Zarubin, P.I. Joint Inst. for Nuclear Research, Dubna (Russian Federation); Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of High Energy. 1994. In *JINR Rapid Communications. Collection 3.* 53p. Order Number DE95615980. Source: OSTI; NTIS (US Sales Only); INIS.

Investigation of time characteristics of Metal-Resistive layer Semiconductor structure based on silicon avalanche detectors with negative feedback, proposed for time-of-flight, is described. Time resolutions of 550 ps on β-electrons and 250 ps on LED light pulses were obtained. Design and principles of operation are described briefly. (author). 5 refs.; 4 figs.

8377 (JINR-E–13-94-214) **Experimental Study of Particle Separation in a L Kr Ionization Chamber by Multiple Measuring of dE/d x Using the Shape Analysis of Signal.** Cantoni, P. (Istituto Nazionale di Fisica Nucleare, Bologna (Italy)); Frabetti, P.L.; Stagni, L. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems. 1994. 14p. Order Number DE95613074. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Nuclear Instruments and Methods.

Charged particle (π - k) separation in the momentum range 0.5 - 0.7 GeV/c using a new method of shape analysis of the signal from a liquid krypton (L Kr) ionization chamber has been experimentally studied. The detector has been exposed to pions and protons at T11 test beam at the CERN PS. The shape of the preamplifier output signal was recorded by a waveform digitizer, then it was doubly 'differentiated' to obtain few measurements of dE/d x inside a 2 cm gap. This permits an increase of the boundary momentum of 2 σ separation from 0.6 GeV/c to 0.68 GeV/c. The comparison with the Monte Carlo result shows good agreement. (author). 11 refs.; 9 figs.

8378 (JINR-E–13-94-247) **Investigation of Silicon Planar Detectors for LHC project.** Cheremukhin, A. (Joint Inst. for Nuclear Research, Dubna (Russian Federation)); Golutvin, I.; Rashevskij, A. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1994. 18p. Order Number DE95613075. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Nuclear Instruments and Methods.

Planar detectors developed by ELMA, Zelenograd, Russia, For high energy physics application have been investigated. Detectors with dimensions 20-20-0.4 mm^3 have been manufactured of high resistivity (2-6 k Ohm · cm) n-type float-zone silicon (FZ-Si). Parameters of deep levels in the forbidden gap, defect types and concentration, donor and acceptor impurity concentration have been determined for two samples of starting float zone crystals manufactured by two different producers: FZ-Si from WACKER CHEMITRONICS and Zaporozh'e Titanium-Magnesium Factory (ZTMF, Zaporozh'e, UK).The research includes the measurements of current-voltage characteristics, capacitance-voltage characteristics, charge collection efficiency and signal kinetics for the detector experimental set. The results have shown that the detector parameters are acceptable for their application in high energy physics as well as in the field of traditional spectroscopy. (author). 11 refs.; 13 figs.; 2 tabs.

8379 (JINR-E–13-94-283) **New Development of a Small-Angle Neutron Scattering Instrument for a Pulsed Neutron Source.** Nikitenko, Yu.V. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Neutron Physics. 1994. 6p. Order Number DE95613004. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to ICNS'94, Senai, JP.

A new way of increasing the luminosity of the pinhole geometry SANS spectrometer is proposed for a pulsed neutron source. The method consists in changing the pinhole cross-sections area according to a certain dependence on time. As the result, the luminosity increases several times at a fixed distortion of the scattering law. (author). 10 refs.; 2 figs.

8380 (JINR-E–13-94-284) **A Wide Spectrum Neutron Polarizer for a Pulsed Neutron Source.** Nikitenko, Yu.V. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Neutron Physics. 1994. 4p. Order Number DE95613005. Source: OSTI; NTIS (US Sales Only); INIS.

Submitte to ICNS'94, Sendai, JP.

A wide spectrum neutron polarizer for a pulsed neutron source is considered. The polarizer is made in a form of a set of magnetized mirrors placed on a drum. Homogeneous rotation of the polarizer is synchronized with the power pulses of the neutron source. The polarizer may be utilized in a collimated neutron beam with cross section of the order of magnitude of 100 cm^2 within a wavelength from 2 up to 20 A on sources with a pulse repetition frequency up to 50 Hz. (author). 5 refs.; 3 figs.

8381 (JINR-R–1-94-239) **Background Event Discrimination in Neutron Time-of-Fight Measurements at Beams of Relativistic Nuclei of the JINR synchrotron.** Tsvetkov, I.O.; Yurevich, V.I.; Lyapin, V.G. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of High Energy. 1994. 10p. (In Russian). Order Number DE95613006. Source: OSTI; NTIS (US Sales Only); INIS.

The sources of background events and background discrimination methods have been investigated for time-of-flight neutron spectrometry with nuclear beam of the JINR synchrotron. (author). 3 refs.; 10 figs.

8382 (JINR-R–6-94-272) **The Method of Decay Energy Determination for Short-Lived Nuclei in On-Line Experiments.** Veselov, G.V. (Leningradskij Gosudarstvennyj Univ., Leningrad (Russian Federation)); Sergienko, V.A.; Gromov, K.Ya.; Fominykh, V.I.; Yuldashev, M.B.; Potempa, A.; Potempa, Y. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems. 1994. 8p. (In Russian). Order Number DE95613010. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Izvestiya Akademii Nauk SSSR, Seriya Fizicheskaya.

The method of measurements of endpoint energies of positron spectra by using Ge(Hp)-detector is described. The method has been applied to measure the decay energies of 25 isotopes of rare earths elements. Taking into account effects of the positron back and side scattering, Bremsstrahlung and energy summing of positron and AR (annihilation radiation) pulses allowed to decrease the systematic error of positron endpoint energy determinations up to 30 keV. That is, as a rule, enough for comparisons with mass formulae and for analyzing nuclear decay properties. (author). 7 refs., 5 figs., 1 tab.

8383 (JINR-R–13-94-267) **Equipment for Measurement ICE and eγ-Coincidence Spectra.** Sehrehehtehr, Zh.; Yuldashev, M.B.; Gorozhankin, V.M.; Gromov, K.Ya.; Kalinnikov, V.G.; Kuznetsov, V.V.; Osipenko, B.P.; Fominykh, V.I. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems. 1994. 6p. (In Russian). Order Number DE95613007. Source: OSTI; NTIS (US Sales Only); INIS.

The mini-orange magnetic spectrometer system for the measurement of conversion electron spectra and eγ-coincidences has been described. Mini-orange spectrometer efficiencies for two types of magnets are determined at distances 40 and 80 mm between the source and detector. The efficiency increase and the effect of elimination of the continuous background connected with the positron radiation have been demonstrated using the mini-orange on the example of ^{147} Tb($T_{1/2}$=1.7 h) conversion electron spectrum in the energy range 1-2 MeV. (author). 7 refs., 2 figs.

8384 (JINR-R–13-94-276) **The Calculation of the Main Characteristics of Ge(Li)-NaI(Tl) Anti-Compton Spectrometer by Monte Carlo Method.** Adam, J. (Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems); Blazek, K.; Maly, P.; Wagner, V. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems. 1994. 11p. (In Russian). Order Number DE95613008. Source: OSTI; NTIS (US Sales Only); INIS.

The experimental and calculated values of suppression factor of continuous Compton spectra measured by anti-Compton spectrometer (ACS) are presented. The calculations were made by means of Monte Carlo method taking into account photoelectric absorption of γ-rays, Compton scattering and pair production. The response function of ACS for ^{60} Co source was investigated. (author). 24 refs., 2 figs., 1 tab.

8385 (JINR-R–13-94-277) **Design (Ge-BGO+NaI(Tl)) of Anti-Compton Spectrometer.** Adam, J. (Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems); Blazek, K.; Maly, P.; Honusek, M. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems. 1994. 22p. (In Russian). Order Number DE95613009. Source: OSTI; NTIS (US Sales Only); INIS.

The design of an asymmetric anti-Compton shield for BGO and NaI(Tl) crystals is described. Its dimensions have been optimized by means of Monte Carlo calculations over the range of incident gamma-ray energies between 0.2 MeV and 3.5 MeV. Monte Carlo method takes into account photoelectric absorption of γ-rays, Compton scattering and pair production. The suppression factor of the continuous ^{60} Co spectrum for the BGO and NaI(Tl) crystals of different dimensions is calculated for anti-Compton shield. (author). 25 refs., 9 figs., 2 tabs.

8386 (JINR-R–13-94-305) **Scintillator Based on SiO_2-Aerogel.** Bojko, I.R. (Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems); Ignatenko, M.A.; Esenak, K.; Kuhta, L.; Ruzicka, J.; Fainor, V. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems. 1994. 15p. (In Russian). Order Number DE95613076. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Nuclear Instruments and Methods.

By doping the SiO_2-aerogel with the wavelength shifter POPOP a scintillator with intermediate density between the gas and the solid state has been produced. The emission time and the light output of two samples with different concentration of the doping agent have been investigated. The light pulse shapes of the both samples are well approximated by a sum of two exponents with the decay times 1.4$\pm$0.1 ns (58% of total light output) and 5.2$\pm$0.4 ns (42%). Under irradiation of 5.5 MeV α-particles the light output of the sample with smaller wavelength shifter concentration was 30% and that of the sample with larger concentration was 8% of the light output of a plastic scintillator (polystyrene, 2% paraterphenil, 0.2% POPOP). Under irradiation of cosmic rays the light outputs of the samples exceeded the light output of the pure aerogel by 35% and 100% respectively. The obtained data point that the α/β ratio for both samples is close to 1. (author). 10 refs., 9 figs., 1 tab.

8387 (JINR-R–13-94-309) **Streamer Chamber Memory Time Measurement with an Auxiliary Spark Chamber.** Aksinenko, V.D. (Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of High Energy); Volodin, V.D.; Glagoleva, N.S.; Lukstin'sh, Yu.; Matyushin, A.T.; Matyushin, V.T.; Saitov, I.S.; Nurgozhin, N.N. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of High Energy. 1994. 15p. (In Russian). Order Number DE95613077. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Pribory i Tekhnika Ehksperimenta.

Results of realization of a new method of measuring of the streamer chamber memory time are presented. The method is based on usage of an auxiliary spark chamber which is blown through with the gas of the streamer chamber. Accuracy of ten percent was achieved for usual operation memory time of a few microseconds. (author). 9 refs., 7 figs.

8388 (KAERI/RR–1257/93) **Applications of optical fiber to the remote fluorescence analysis.** Shin, Jang Soo (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Kim, Duck Hueon; Lee, Soo Ho. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Dec 1992. 94p. (In Korean). Order Number DE95613152. Source: OSTI; NTIS; INIS.

The laser fluorometer developed in 1987 has been used in real circumstances for trace uranium analysis. And, we have been trying to improve the instrument to be able to apply in analytical circumstances of remote measurement using optical fiber. The N_2 laser beam and the resulting fluorescence light could be successfully transmitted through a quartz-made optical fiber. The wavelength resolution and the fluorescence decay time resolution induced by pulsed N_2 laser were used to the uranium fluorescence analyses. The fluorescence of uranium in nitric acid medium was measured successfully using the system. The fluorescence signal was analysed using simplex method which is useful to deconvolute the mixed signals. An analytical method using thermal lens effect was developed. The method will be a complementary one for the fluorescence measurement. (Author).

8389 (KAERI/RR–1261/93) **Development of high energy radiation measurement system with diode.** Ji, Young Hoon (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Lee, Dong Han; Koh, Kyung Hwan; Cho, Chul Koo; Yoon, Hyong Keun; Lee, Seong Koo; Choi, Moon Sik. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Dec 1993. 36p. (In Korean). Order Number DE95613153. Source: OSTI; NTIS; INIS.

The objectives of our experiment are as followed; 1. to develop the simply and rapidly measurable system for various parameters of emanated radiation by using the diode with low cost and easy availability, 2. to establish the basic technique for computerization of measurement system. The results are as followed; Detector, using 1N4007 silicon diode, was selected as the most superior probe, because the leakage current was 0.5pA, signal current 1.82nA, and the ratio of noise/signal was 0.03%. The measured results showed that linearity and stability of 1N4007 silicon diode detector were within 1.6%, sensitivity by radiation damage was decreased maximum 1% per 100Gy. Also, beam flatness and symmetry were within 2%. (Author).

8390 (KAERI/RR–1289/93) **Domestic production of control parts for the nuclear waste treatment facility.** Chung, Chong Eun (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Han, Kwang Soo; Park, Kwang Hyeon; Hong, Suk Boong; Choi, Myung Jin; Kim, Seung Bok; Kim, Jung Bok. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Dec 1993. 110p. (In Korean). Order Number DE95613011. Source: OSTI; NTIS; INIS.

The control part IND-100, which interfaces the field signals to the control networks in the control systems of PIEF (Post-Irradiated Examination Facility) and RWTF (Radioactive Waste Treatment Facility), was designed and fabricated. Preamplifier boards for radiation detectors, proportional counter and Geiger-Mueller tube which are in use in the radiation monitoring systems, were also designed and fabricated. Control parts which may be replaced with the domestic parts were surveyed, and a domestic relay model and a recorder model were selected as the replaceable ones. To improve the control systems, adoption of programmable controller to the conventional relay logic system were considered and analyzed. (Author).

8391 (KAERI/RR–1349/93) **Study of materials properties by neutron beam applications -Development of the advanced nuclear materials-.** Kim, Huhn Jun (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Kim, Yong Chae; Jeon, Byeong Chil; Lee, Chang Hee; Lee, Jeong Soo; Seong, Baek Seok; Shim, Hae Seop; Choi, Byeong Hoon; Ho, Jong Hwa. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jul 1994. 200p. (In Korean). Order Number DE95613154. Source: OSTI; NTIS; INIS.

Detailed design of the High Resolution Powder Diffractometer (HRPD) has been finished. As for essential components development, 1-D PSD counting system, driving of the mechanical components of spectrometers, and a chopper TOF spectrometer are in progress favourably. Study of crystal structure analysis on Uranium Silicides (U_3Si, U_3Si_2) and oxide superconductor ($YBa_2Cu_3O_{7-x}$) using the Rietveld refinement commened through the collaboration with foreign laboratories, and texture and analysis has been continued at the KRR-2 site. The Neutron Radiography Facility for the KMRR NR beam tube was designed by providing with 2 separate exposure cells for investigating the high radioactive components and general industrial purposes by real time inspection using neutron-TV and imaging processing technique. And development of neutron-TV and related imaging processing is in progress. Development of Si doping techniques by neutron transmutation method such as design of NTD irradiation tube, the fabrication of the electric control system and mechanical driving unit, study of NTD-Si irradiation damage, etc., are in progress. (Author).

8392 (LBL–36273) **$LuAlO_3$: A high density, high speed scintillator for gamma detection.** Moses, W.W. (Lawrence Berkeley Lab., CA (United States)); Derenzo, S.E.; Fyodorov, A.; Korzhik, M.; Gektin, A.; Minkov, B.; Aslanov, V. Lawrence Berkeley Lab., CA (United States). Nov 1994. 5p. Sponsored by USDOE, Washington, DC (United States);Department of Health and Human Services, Washington, DC (United States). DOE Contract AC03-76SF00098. Grants P01-HL25840, R01 CA48002, R01 NS29655. (CONF-9411173–2: IEEE nuclear science symposium, Norfolk, VA (United States), 1-5 Nov 1994). Order Number DE95004678. Source: OSTI; NTIS; INIS; GPO Dep.

We present measurements of the scintillation properties cerium doped lutetium aluminum perovskite, $LuAlO_3$:C, new dense (ρ=8.34 g/cm^3) inorganic scintillator. This material has a 511 keV interaction length and photoelectric fraction 1.1 cm and 32% respectively, which are well suited to gamma ray detection. In powdered form with 0.5% cerium concentration, the scintillation light output is estimated to be 9,600 photons/MeV of deposited energy, the emission spectrum is a single peak centered at 390 nm, and the fluorescence lifetime is described by the sum of 3 exponential terms, with 60% of the light being emitted with a 11 ns decay time, 26% with a 28 ns decay time, and 13% with a 835 ns decay time. Single crystals contaminated with =10% lutetium aluminum garnet ($Lu_3Al_5O_{12}$) have significantly altered scintillation properties. The light output is 26,000 photons/MeV (3.2 times that of BGO), but the decay time increases significantly (1% of the light is emitted with a 10 ns decay time, 15% with a 245 ns decay time, and 85% with a 2010 ns decay time) and the emission spectrum is dominated by a peak centered at 315 nm with a secondary peak centered at 500 rum. The short decay lifetime, high density, and reasonable light output of $LuAlO_3$:C (the perovskite phase) suggest that it is useful for applications where high counting rates, good stopping power, good energy resolution, and fast timing are important. However, it is necessary to grow single crystals that are uncontaminated by the garnet phase to realize these properties.

8393 (LBL–36287) **Charged particle detectors based on high quality amorphous silicon deposited with hydrogen or helium dilution of silane.** Hong, Wan-Shick (Lawrence Berkeley Lab., CA (United States)); Drewery, J.S.; Jing, Tao; Lee, Hyoung-Koo; Kaplan, S.N.; Perez-Mendez, V.; Mireshghi, Ali; Kitsuno, Yu. Lawrence Berkeley Lab., CA (United States). Nov 1994. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00098. (CONF-941061–14: Nuclear science symposium: medical imaging conference, Norfolk, VA (United States), 30 Oct - 5 nov 1994). Order Number DE95004671. Source: OSTI; NTIS; INIS; GPO Dep.

Electrical transport properties of the authors PECVD a-Si:H material has been improved by using hydrogen and/or helium dilution of silane and lower substrate temperature for deposition. For hydrogen-diluted material they have measured electron and hole mobilities $\sim$ 4 times larger, and $\mu\tau$ values 2-3 times higher than for their standard a-Si:H. The density of ionized dangling bonds (N_D^*) also showed a factor of 5-10 improvement. Due to its higher conductivity, the improved a- Si:H material is more suitable than conventional a-Si:H for TFT applications. However, it is difficult to make thick layers by H-dilution because of high internal stress. On the other hand, thick detectors can be made at a faster rate and lower stress by low temperature deposition with He-dilution and subsequent annealing. The internal stress, which causes substrate bending and delamination, was reduced by a factor of 4 to ~90 MPa, while the electronic quality was kept as good as that of the standard material. By this technique 35 μm-thick n-i-p diodes were made without significant substrate bending, and the electronic properties, such as electron mobility and ionized dangling bond density, were suitable for detecting minimum ionizing particles.

8394 (LUNFD6-NFFR–3064) **Nuclear reaction analysis - Development and application.** Sjoeland, K.A. Lund Univ. (Sweden). Dept. of Nuclear Physics. 6 Oct 1994. 10p. Order Number DE95613155. Source: OSTI; NTIS; INIS.

This thesis concerns itself with the development of Nuclear Reaction Analysis (NRA). A technique to reject pile-up pulses and defective tail pulses from surface barrier detectors by the use of pulse shape discrimination (PSD) is demonstrated. The characteristic tau value for pile-up rejection is shown to be less than 56 ns. Its effects on detection limits from tail reduction in Particle Elastic Scattering Analysis (PESA) and pile-up peak suppression is discussed. The impact of the PSD technique on various NRA methods is discussed. Boron Neutron Capture Therapy (BNCT) is a cancer therapy whose efficiency depends on the location on a subcellular level of boron. In the work presented in this thesis an attempt is made to develop a method to analyze boron in biological tissue with a detection limit at the ng/cm2 level and a lateral resolution of about 1 micrometer. Various nuclear reactions have been investigated in order to find one that can be used with a Nuclear Microprobe (NMP). 10B has been studied with the photon-tagged Nuclear Reaction Analysis (pNRA) in the backward and forward directions. 11B has been studied at the broad low energy resonance (Ep=0.66 MeV) that emits alpha particles. It is shown that it is possible to measure boron in biological tissue with the latter technique at the NMP. The problem to image the cell is also discussed. 3 refs.

8395 (PNL-SA–22048) **Intercomparison of high energy neutron personnel dosimeters.** McDonald, J.C. (Pacific Northwest Lab., Richland, WA (United States)); Akabani, G.; Loesch, R.M. Pacific Northwest Lab., Richland, WA (United States). Mar 1993. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-9303220–4: Workshop on measurement quality assurance for ionizing radiation, Washington, DC (United States), 16-18 Mar 1993). Order Number DE95004563. Source: OSTI; NTIS; INIS; GPO Dep.

An intercomparison of high-energy neutron personnel dosimeters was performed to evaluate the uniformity of the response characteristics of typical neutron dosimeters presently in use at US Department of Energy (DOE) accelerator facilities. It was necessary to perform an intercomparison because there are no national or international standards for high-energy neutron dosimetry. The testing that is presently under way for the Department of Energy Laboratory Accreditation Program (DOELAP) is limited to the use of neutron sources that range in energy from about 1 keV to 2 MeV. Therefore, the high-energy neutron dosimeters presently in use at DOE accelerator facilities are not being tested effectively. This intercomparison employed neutrons produced by the $^{9}Be(p,n)^{9}B$ interaction at the University of Washington cyclotron, using 50-MeV protons. The resulting neutron energy spectrum extended to a maximum of approximately 50-MeV, with a mean energy of about 20-MeV. Intercomparison results for currently used dosimeters, including Nuclear Type A (NTA) film, thermoluminescent dosimeter (TLD)-albedo, and track-etch dosimeters (TEDs), indicated a wide variation in response to identical doses of high-energy neutrons. Results of this study will be discussed along with a description of plans for future work.

8396 (PNL-SA–24009) **Evaluation of new and conventional thermoluminescent phosphors for environmental monitoring using automated thermoluminescent dosimeter readers.** Rathbone, B.A.; Endres, A.W.; Antonio, E.J. Pacific Northwest Lab., Richland, WA (United States). Oct 1994. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-941017–6: 4. conference on radiation protection and dosimetry, Orlando, FL (United States), 24-27 Oct 1994). Order Number DE95004571. Source: OSTI; NTIS; INIS; GPO Dep.

In recent years, there has been considerable interest in a new generation of super-sensitive thermoluminescent (TL) phosphors for potential use in routine personnel and environmental monitoring. Two of these phosphors, α-Al_2O_3:C and LiF:Mg,Cu,P, are evaluated in this paper for selected characteristics relevant to environmental monitoring, along with two conventional phosphors widely used in environmental monitoring, LiF:Mg,Ti and CaF_2:Dy. The characteristics evaluated are light-induced fading, light-induced background, linearity and variability at low dose, and the minimum measurable dose. These characteristics were determined using an automated commercial dosimetry system (Harshaw System 8800) and routine processing protocols. Annealing and readout protocols for each phosphor were optimized for use in a large-scale environmental monitoring program.

8397 (PNL-SA–24010) **Site-specific calibration of the Hanford personnel neutron dosimeter.** Endres, A.W.; Brackenbush, L.W.; Baumgartner, W.V.; Rathbone, B.A. Pacific Northwest Lab., Richland, WA (United States). Oct 1994. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-941017–7: 4. conference on radiation protection and dosimetry, Orlando, FL (United States), 24-27 Oct 1994). Order Number DE95004570. Source: OSTI; NTIS; INIS; GPO Dep.

A new personnel dosimetry system, employing a standard Hanford thermoluminescent dosimeter (TLD) and a combination dosimeter with both CR-39 nuclear track and TLD-albedo elements, is being implemented at Hanford. Measurements were made in workplace environments in order to verify the accuracy of the system and establish site-specific factors to account for the differences in dosimeter response between the workplace and calibration laboratory. Neutron measurements were performed using sources at Hanford's Plutonium Finishing Plant under high-scatter conditions to calibrate the new neutron dosimeter design to site-specific neutron spectra. The dosimeter was also calibrated using bare and moderated ^{252}Cf sources under low-scatter conditions available in the Hanford Calibration Laboratory. Dose equivalent rates in the workplace were calculated from spectrometer measurements using tissue equivalent proportional counter (TEPC) and multisphere spectrometers. The accuracy of the spectrometers was verified by measurements on neutron sources with calibrations directly traceable to the National Institute of Standards and Technology (NIST).

8398 (PNL-SA–24144) **Survey speeds to detect one times and three times total contamination values from U.S. Department of Energy Radiological Control Manual, Table 2-2.** Johnson, M.L. Pacific Northwest Lab., Richland, WA (United States). Oct 1994. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-941017–5: 4. conference on radiation protection and dosimetry, Orlando, FL (United States), 24-27 Oct 1994). Order Number DE95004564. Source: OSTI; NTIS; INIS; GPO Dep.

This report documents maximum scan speeds to maintain the minimum detectable activity (MDA) of Hanford contamination survey instruments at one times or three times the total contamination value. Scan speeds are interpolated from empirically derived minimum detectable count rates (MDCR) for beta/gamma and alpha contamination survey instruments. The MDCRs were measured using distributed contamination sources. The instruments tested were a 15.5-cm^2 pancake Geiger-Mueller (GM) detector, a 100-cm^2 gas proportional detector, and a 50-cm^2 Hanford portable alpha meter (PAM). The MDCR for a scanning survey is highly dependent on survey technique. Scanning surveys at Hanford are performed by scanning the surface with the probe held a maximum of 6 mm (1/4 in.) away from the surface. If an increase above background is noted, the technician pauses for 5 to 10 seconds. For this evaluation, any counts detected with an alpha survey instrument are treated as an increase above background (assumed to be 0 cpm). During the 5- to 10-second count, if additional counts are detected, the area is assumed to be contaminated. Methods for calculating the MDA were previously developed and reported in Goles et al. (1991). This report also provides MDAs for a 5-second static count with 67% and 95% probability of detection. The 5-second static count is conducted with the probe in contact with the surface being surveyed. The 67% detection probability is based on a Draft ANSI Standard N13.12 (ANSI 1978). The 95% detection probability is based on typical confidence levels used with fixed sample-counting instruments.

8399 (SLAC-PUB–6669) **BABAR - the detector for the PEP II B Factory at SLAC.** Lueth, V. BABAR Collaboration. Stanford Linear Accelerator Center, Menlo Park, CA (United States). Sep 1994. 6p. Sponsored by USDOE, Washington, DC (United States).

DOE Contract AC03-76SF00515. (CONF-940816–72: Meeting of the Division of Particles and Fields of the American Physical Society, Albuquerque, NM (United States), 2-6 Aug 1994). Order Number DE95006065. Source: OSTI; NTIS; INIS; GPO Dep.

BABAR refers to the detector that is being designed for the PEP II B-Factory at SLAC to perform a comprehensive study of CP violation in B meson decays. The design requirements and the principal detector components are briefly described. A summary of the expected physics performance is presented.

8400 (SLAC-PUB–6701) **Test of an array of CsI(Tl) crystal towers for a low or medium energy e^+e^- collider calorimeter.** King, M.E. Stanford Linear Accelerator Center, Menlo Park, CA (United States). Oct 1994. 3p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-930761–1: International Europhysics conference on high-energy physics, Marseille (France), 22-28 Jul 1993). Order Number DE95006068. Source: OSTI; NTIS; INIS; GPO Dep.

Energy and position resolution results of a test of an array of CsI(Tl) crystal towers in an e^-/π^- beam (120 to 400 MeV) at TRIUMF are presented. The array was designed to study the effects of longitudinal and transverse crystal segmentation on energy and position resolution, and background rejection. The author also studied a wavelength-shifter and multi-photodiode readout system suitable for use in an electromagnetic CsI calorimeter in a detector at low and medium energy, high-luminosity e^+e^- storage rings. Energy resolution of $(1.69 \pm 0.08)\%/\sqrt{E}$ and $(1.83 \pm 0.05)\%/\sqrt{E}$ were obtained for two different crystal tower configurations. Position resolution of 6.5 (9.0) mm was obtained at 300 (120) MeV for four 4 x 4 cm^2, 4 radiation length CsI crystals.

8401 (SLAC-PUB–6731) **Test of a conceptual prototype of the total internal reflection Cherenkov imaging detector (DIRC) with cosmic muons.** Aston, D. (Stanford Linear Accelerator Center, CA (United States)); Kawahara, H.; McShurley, D.; Muller, D.; Oxoby, G.; Hearty, C.; Kadyk, J.; Lynch, G.; Lu, A. Stanford Linear Accelerator Center, Menlo Park, CA (United States). Dec 1994. 6p. Sponsored by USDOE, Washington, DC (United States);National Science Foundation, Washington, DC (United States). DOE Contract AC03-76SF00515. (LBL–36536; CONF-941061–15: Nuclear science symposium: medical imaging conference, Norfolk, VA (United States), 30 Oct - 5 nov 1994). Order Number DE95006072. Source: OSTI; NTIS; INIS; GPO Dep.

The DIRC is a totally internally reflecting Cherenkov imaging detector proposed for particle identification at the asymmetric e^+e^- B factories. First test results from a conceptual prototype using cosmic muons are reported. The photo-electron yield and the single Cherenkov photon resolution at various track dip angles and positions along the radiator bar have been measured. The results are consistent with estimates and Monte-Carlo simulations.

4402 Radiation Effects On Instrument Components, Instruments, Or Electronic Systems

8402 (IA–1486, pp. 30) **Gamma radiation effects on some optical glasses.** Liepmann, M.J.; Boehm, L.; Vagish, Z. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. GLASS/physical radiation effects; AMBIENT TEMPERATURE; ANNEALING; COBALT 60; DOSE RATES; GAMMA SOURCES; GLASS; HEAT TREATMENTS; IMPURITIES; LIGHT TRANSMISSION; REFRACTIVE INDEX; TEMPERATURE RANGE 0400-1000 K; THERMAL RECOVERY; ULTRAVIOLET RADIATION; VISIBLE RADIATION; VISIBLE SPECTRA

8403 (IA–1486, pp. 70-71) **Radiation and high-field-induced interface state generation in MOS structures with modified nitrided oxide.** Shappir, J.; Roter, T.; Levinson, J. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. SUPERCONDUCTING JUNCTIONS/physical radiation effects; ELECTRONIC EQUIPMENT; EQUIPMENT INTERFACES; IONIZING RADIATIONS; NITRIDATION; NITRIDES; OPTIMIZATION; SILICON; SILICON OXIDES; SURFACE COATING; SURFACES; TUNNEL EFFECT

8404 (IA–1486, pp. 71-72) **New insight into proton-induced latchup. Experiments and modelling.** Levinson, J.; Akkerman, A.; Victoria, M.; Hass, M.; Ilberg, D.; Alurralde, M.; Henneck, R.; Lifshitz, Y. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. PIXE ANALYSIS/sensitivity; CHARGE CARRIERS; SENSITIVITY; PROMPT ELECTRONS; PROMPT PROTONS; SIMULATION

8405 (IA–1486, pp. 72) **Track effects and their influence on heavy ion energy losses in semiconductor devices.** Akkerman, A.; Levinson, A.; Ilberg, D.; Lifshitz, Y. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. SEMICONDUCTOR DEVICES/physical radiation effects; CHARGE COLLECTION; CHARGED-CURRENT INTERACTIONS; ELECTRON DETECTION; LET; PROTONS; SOLID STATE PHYSICS

8406 (IA–1486, pp. 123) **Study of a single-event-upset in PAL16R8.** Barak, J.; Levinson, J.; Zentner, A.; David, D.; Even, O.; Hass, M.; Ilberg, D.; Lifshitz, Y. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. ELECTRONIC EQUIPMENT/physical radiation effects; CROSS SECTIONS; IONS; LET

8407 (IA–1486, pp. 123-124) **A portable planar ^{90}Sr irradiation setup for total dose testing of electronic devices.** Lifshitz, Y.; Levinson, J.; Noter, Y.; Shamai, Y.; Akkerman, A.; Even, O.; Zentener, A.; Israeli, M.; Giberkhterman, A.; Singer, L. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

A novel portable β irradiation setup using a planar ^{90}Sr β source was designed. Calibration procedures, dose calculations and comparative study of ^{60}Co and ^{90}Sr irradiations of a specific device were developed. (authors). 1 ref., 1 fig.

8408 (IA–1486, pp. 125) **Radiation tolerance of the Offec Leo satellites. Design-policy, ground testing and flight data evaluation.** Ilberg, D.; Lifshitz, Y.; Noter, Y.; Barak, J.; Akkerman, A.; Brand, D.; Zentner, A.; David, D.; Levinson, J. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. SATELLITES/physical radiation effects; DOSE-RESPONSE RELATIONSHIPS; EVALUATED DATA; EVALUATION; HEAVY ION ACCELERATORS; PERFORMANCE; POST-IRRADIATION EXAMINATION; PROTON PRECIPITATION; RADIATION BELTS; RADIATION DOSES; SATELLITES

4404 Well Logging Instrumentation

Refer also to citation(s) 8651

8409 (PNL-SA–24344) **CsI(Tl) with photodiodes for identifying subsurface radionuclide contamination.** Stromswold, D.C. (Pacific Northwest Lab., Richland, WA (United States)); Meisner, J.E.; Nicaise, W.F. Pacific Northwest Lab., Richland, WA (United States). Oct 1994. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830 ; AC06-87RL10930. (CONF-9411173–1: IEEE nuclear science symposium, Norfolk, VA (United States), 1-5 Nov 1994). Order Number DE95004558. Source: OSTI; NTIS; INIS; GPO Dep.

At the US Department of Energy's Hanford Site near Richland, Washington, underground radioactive contamination exists as the result of leaks, spills, and intentional disposal of waste products from plutonium-production operations. Characterizing these contaminants in preparation for environmental remediation is a major

effort now in progress. In this paper, a cylindrical (15 x 61 mm) CsI(Tl) scintillation detector with two side-mounted photodiodes has been developed to collect spectral gamma-ray data in subsurface contaminated formations at the U.S. Department of Energy's Hanford Site. It operates inside small-diameter, thick-wall steel pipes pushed into the ground to depths up to 20 m by a cone penetrometer. The detector provides a rugged, efficient, magnetic-field-insensitive means for identifying gamma-ray-emitting contaminants (mainly ^{137}Cs and ^{60}Co). Mounting two 3 x 30-mm photodiodes end-to-end on a flat area along the detector's side provides efficient light collection over the length of the detector.

8410 (WHC-SD-EN-TI–292) **Calibration of the radionuclide logging system germanium detector.** Randall, R.R. Westinghouse Hanford Co., Richland, WA (United States). 5 Dec 1994. 18p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95004512. Source: OSTI; NTIS; INIS; GPO Dep.

High resolution passive gamma-ray logging, high resolution gamma-ray-emitting nuclides in areas surrounding underground waste disposal facilities on the US Department of Energy's Hanford Site. Gamma-ray source concentrations are derived from log data by calculations that employ the calibration factors and correction functions described in this report. Calibration data were collected with a Radionuclide Logging System. Analyses of the calibration data established: (1) calibration factors for potassium, uranium, and thorium, and (2) a calibration function that permits assessments of cesium-137, cobalt-60, and other artificial nuclides not represented in the calibration models.

4405 Thermal Instrumentation

8411 High temperature probe. Swan, R.A. To Dept. of Energy. 1992. Filed date 4 Nov 1992. U.S. Patent Application 7-971,111. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. Order Number DE95006109. Source: OSTI; NTIS (US Sales Only); GPO Dep.

A high temperature probe is claimed for sampling, for example, smokestack fumes, and is able to withstand temperatures of 3000°F. The probe is constructed so as to prevent leakage via the seal by placing the seal inside the water jacket whereby the seal is not exposed to high temperature, which destroys the seal. The sample inlet of the probe is also provided with cooling fins about the area of the seal to provide additional cooling to prevent the seal from being destroyed. Also, a heated jacket is provided for maintaining the temperature of the gas being tested as it passes through the probe. The probe includes pressure sensing means for determining the flow velocity of an efficient being sampled. In addition, thermocouples are located in various places on the probe to monitor the temperature of the gas passing there through.

8412 Method and apparatus for optical temperature measurement. O'Rourke, P.E.; Livingston, R.R.; Prather, W.S. To Dept. of Energy. 1992. Filed date 20 Nov 1992. U.S. Patent Application 7-979,672. 28p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE95006105. Source: OSTI; NTIS (US Sales Only); GPO Dep.

A temperature probe and a method are claimed for using said probe for temperature measurements based on changes in light absorption by the probe. The probe comprises a first and a second optical fiber that carry light to and from the probe, and a temperature sensor material, the absorbance of which changes with temperature, through which the light is directed. Light is directed through the first optical fiber, passes through the temperature sensor material, and is transmitted by a second optical fiber from the material to a detector. Temperature-dependent and temperature-independent factors are derived from measurements of the transmitted light intensity. For each sensor material, the temperature T is a function of the ratio, R, of these factors. The temperature function f(R) is found by applying standard data analysis techniques to plots of T versus R at a series of known temperatures. For a sensor having a known temperature function f(r) and known characteristic and temperature-dependent factors, the temperature can be computed from a measurement of R. Suitable sensor materials include neodymium-doped borosilicate glass, accurate to ±0.5°C over an operating temperature range of about −196°C to 400°C; and a mixture of D_2O and H_2O, accurate to ±0.1°C over an operating range of about 5°C to 90°C.

4406 Optical Instrumentation

Refer also to citation(s) 7324, 7697, 7956, 8271, 8275

8413 Broadband radiometer. Cannon, T.W. 1992. Filed date 28 Oct 1992. U.S. Patent Application 7-967,481. 20p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC36-83CH10093. Order Number DE95006136. Source: OSTI; NTIS (US Sales Only); GPO Dep.

This invention is comprised of a broadband radiometer including (a) an optical integrating sphere having a generally spherical integrating chamber and an entry port for receiving light,(e.g., having visible and ultraviolet fractions), (b) a first optical radiation detector for receiving light from the sphere and producing an electrical output signal corresponding to broadband radiation, (c) d second optical radiation detector for receiving light from the sphere and producing an electrical output signal corresponding to a predetermined wavelength fraction of the broadband radiation, and (d) an output for producing an electrical- signal which is proportional to the difference between the two electrical output signals. The radiometer is very, for example, in measuring the absolute amount of ultraviolet light present in a given light sample.

8414 Lensing duct. Beach, R.J.; Benett, W.J. 1992. Filed date 30 Nov 1992. U.S. Patent Application 7-983,350. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. Order Number DE95006120. Source: OSTI; NTIS (US Sales Only); GPO Dep.

This invention is comprised of a lensing duct to condense (intensify) light using a combination of front surface lensing and reflective waveguiding. The duct tapers down from a wide input side to a narrow output side, with the input side being lens-shaped and coated with an antireflective coating for more efficient transmission into the duct. The four side surfaces are uncoated, preventing light from escaping by total internal reflection as it travels along the duct (reflective waveguiding). The duct has various applications for intensifying light, such as in the coupling of diode array pump light to solid state lasing materials, and can be fabricated from inexpensive glass and plastic.

4408 Miscellaneous Instrumentation

Refer also to citation(s) 7396, 7439, 7822, 8592

8415 (BNL–61272) **The development of a positron ionization gauge.** Jacobsen, F. (Brookhaven National Lab., Upton, NY (United States). Dept. of Physics); Strongin, M.; Ruckman, M.; Wiess, A.; Turner, W.C. Brookhaven National Lab., Upton, NY (United States); Superconducting Super Collider Lab., Dallas, TX (United States). Jan 1994. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016 ; AC35-89ER40486. (SSCL-N–846). Order Number DE95005958. Source: OSTI; NTIS; INIS; GPO Dep.

The authors present a method by which gas pressure (density) can be measured by positrons. The process to monitor is the formation of positronium, Ps, via electron capture by the e^+ from the rest gas molecules. The Ps signal which is proportional to the gas density is obtained from the annihilation photons which are emitted when the Ps atom decays. By this method it is not necessary to have access to the vacuum system in question other than having the possibility of passing a positron beam through it. Also the present method is fully UHV compatible. In its simplest version pressures below 10^{-8} torr (at room temperature) can be measured within a reasonable time. Techniques are discussed which will significantly improve the sensitivity of the present ionization gauge. The specific reason for designing and using the positron ionization gauge is to be able to measure the pressure inside the Superconducting Super Collider beam tubing during simulated operation.

8416 (DOE/MC/29119–3881) **Innovative directional and position specific sampling technique. Phase 3: Final report, July 1992–September 1994.** Hutzel, W.J.; Hill, J.L. III; Foster, E.L.

UTD, Inc., Newington, VA (United States). Sep 1994. 98p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC21-92MC29119. Order Number DE95000006. Source: OSTI; NTIS; INIS; GPO Dep.

The POLO System is a major enhancement to the state of the art for subsurface environmental restoration equipment. The system locate s the tip position of penetrometer probes as they are placed underground while meeting the rigid constraints of environmental restoration applications. POLO is applicable to small diameter probes, does not obstruct the center of the probe, is rugged, is unaffected by the presence of steel or other magnetic material, and is capable of remote operation beneath underground tanks or foundations. The development and adaptation of the POLO System for use with penetrometers has progressed through three development phases prior to commercialization. Phases I and II of the contract included the design, testing, and integration of all components of the POLO device. Efforts were made to simulate field conditions in terms of the scale of the components as well as the operating environment. The preestablished success criterion, which has been maintained throughout the research, was to demonstrate path tracking with a total error of less than 0.50% of the distance traveled for distances less than 70 meters. The results tests on individual POLO components showed that the equipment met or exceeded the success criterion. Phase II laboratory scale path tracking experiments also met the success criterion. Phase III moved the POLO System into the field. The full-scale field demonstration tested the ability of the new POLO Module to track the path of a small diameter probe as it moved underground.

45 MILITARY TECHNOLOGY, WEAPONRY, AND NATIONAL DEFENSE

8417 (ANL/DIS/CP–84377) **Squeezing out all the performance: Using Ingres for a C^{3}I reporting system.** Tatar, J.J. (Argonne National Lab., IL (United States). Decision and Information Sciences). Argonne National Lab., IL (United States). [1994]. 13p. Sponsored by Department of Defense, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9410204–2: 1994 Ingres world, Chicago, IL (United States), 2-6 Oct 1994). Order Number DE95004591. Source: OSTI; NTIS; GPO Dep.

Argonne National Laboratory was tasked with developing a data interface between the Joint Theater Level Simulation (JTLS), a military simulation model, and the Warrior Preparation Center C^{3}I reporting system, an Ingres-based application. The problem was to build an application that could take buffered input/output (I/O) from the simulation and trade it for direct I/O into an Ingres database. At the same time, the database could have up to 100 concurrent users through the C^{3}I reporting system, making retrievals and generating reports, so lock contention had to be minimized. One advantage was that events did not have to be reported immediately. Rather, delays in data updates were desired to emulate reporting delays that occur in the real world. Because of the massive amount of state information generated by time series simulations, a single interface could not maintain the database. Therefore, the problem was partitioned among several processes. One process separated the stream, and others maintained the database with state data from the simulation. A number of specific features in the application are reviewed that may be of interest to other developers faced with the problem of developing applications that have a large transaction throughput.

8418 (ANL/DIS/CP–84531) **Facility agreements under the chemical weapons convention inspections.** Tanzman, E.A. Argonne National Lab., IL (United States). 21 Oct 1994. 2p. Sponsored by Department of Defense, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9410265–2: Continuing legal education seminar on legal implications for business of the chemical weapons convention, Philadelphia, PA (United States), 21 Oct 1994). Order Number DE95004599. Source: OSTI; NTIS; GPO Dep.

The Chemical Weapons Convention (CWC) poses problems of constitutionality, of loss of confidential business information, and even of plant safety. An entirely new and complex worldwide regulatory regime, it nevertheless takes account of the need for certainty in the conduct of industrial production. In particular, the CWC provides for site-specific inspection protocols, called "facility agreements". Facility agreements are not defined in the CWC, but are to be developed as part of the preparations preceding formal entry into force. In effect, they can be thought of as "inspection contracts" governing facilities subject to systematic and routine inspections. Facility agreements are not part of challenge inspections or for cases of alleged use of chemical weapons. The most important fact about facility agreements is that they are not negotiated between the facility owner or operator and the OPCW. Rather, they are negotiated between the State Party and the OPCW. Where United States facilities, such as chemical weapons production facilities, are owned by the government or are under government contract this is not a problem because the government can negotiate on its own behalf. However, where privately owned facilities in the United States enter into facility agreements, the input of those private entities into the terms of the agreement is not guaranteed by the Convention - them OPCW only interfaces with States Parties, not with private firms. The second most important fact is that not all facilities subject to routine inspections must have facility agreements in place. Those declaring chemicals on Schedule 2, Schedule 3 or so-called "other chemical production facilities" may enter into facility agreements, but this is at the option of the State Party.

8419 (BNL–60818) **Program of technical assistance to the organization for the prohibition of chemical weapons, informal report.** Brookhaven National Lab., Upton, NY (United States). [1995]. 108p. Sponsored by Department of Defense, Washington, DC (United States);Defense Nuclear Agency, Washington, DC (United States). DOE Contract AC02-76CH00016. Order Number DE95004843. Source: OSTI; NTIS; GPO Dep.

Currently, U.S. organizations provide technical support to the U.S. Delegation for its work as part of the Preparatory Commission (PrepCom) of the Organization for the Prohibition of Chemical Weapons (OPCW) in The Hague. The current efforts of the PrepCom are focussed on preparations for the Entry-Into-Force (EIF) of the Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons (often referred to as the "Chemical Weapons Convention" (CWC)). EIF of the CWC is expected in 1995, and shortly thereafter the PrepCom will cease to exist, with the OPCW taking over responsibilities under the CWC. A U.S. program of technical assistance to the OPCW for its verification responsibilities may be created as part of U.S. policy objectives after EIF of the CWC. In the summary below, comments by participants are presented in Square Brackets Some of the same points arose several times during the discussions; they are grouped together under the most pertinent heading.

4501 Chemical Explosions and Explosives

8420 (LA–12752-MS) **An assessment of high-energy explosives and metal contamination in soil at TA-67 (12), L-Site, and TA-14, Q-Site.** Haywood, W.; McRae, D.; Powell, J.; Harris, B.W. Los Alamos National Lab., NM (United States). Jan 1995. 18p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. Order Number DE95005743. Source: OSTI; NTIS; GPO Dep.

The results of the field investigation to determine the kind and concentration of explosives found in the soil and on articles at sites known to be contaminated with energetic materials are given in this report. We are concerned about safety and health hazards associated with some explosives, nitro-organics and organic nitrates. Results from the use of the old and new field spot-test kits to detect the presence of energetic materials are given. Also included are data from the high-performance liquid chromatography (HPLC) analyses of acetonitrile extracts from Q-Site soil samples, and data from the energy-dispersive x-ray fluorescence (EDXRF) analyses for hazardous metals on the same samples.

8421 (LA–12898-MS) **Hydrolysis of plutonium: Corrosion kinetics in DMSO solutions containing simulated high explosive and water.** Haschke, J.M.; Pruner, R.E. II. Los Alamos

National Lab., NM (United States). Jan 1995. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. Order Number DE95005740. Source: OSTI; NTIS; GPO Dep.

A sequence of experiments is described that address the compatibility of plutonium metal with dimethyl sulfoxide solvent and with solutions containing simulated HMX explosive and simulated explosive plus water. In the absence of water, reaction is slow and forms a thin adherent product layer on clean metal surfaces. Corrosion of oxide-coated plutonium is observed after 15 to 20 days in a solution containing 0.18 mass % (0.11 M) water. After corrosion initiates, the rate accelerates rapidly and attains a value of 0.13 mg Pu/cm^2 h with a surface that is approximately one percent active. Dependence of the Pu + H_2O reaction on water concentration is evaluated using the data from literature sources. Hazards associated with the use of wet dimethyl sulfoxide as a solvent for removing explosives during weapon dismantlement are identified and a simple method for their mitigation is outlined.

8422 (LBL–35946) **Recording experiment on Rainier Mesa in conjunction with a reflection survey.** Johnson, L.R. Lawrence Berkeley Lab., CA (United States). Jun 1994. 20p. Sponsored by USDOE, Washington, DC (United States);Department of Defense, Washington, DC (United States). DOE Contract AC03-76SF00098. DOD Contract F49620-94-1-0197. (CONF-9404100–15: Symposium on the non-proliferation experiment results and implications for test ban treaties, Rockville, MD (United States), 19-21 Apr 1994). Order Number DE95003440. Source: OSTI; NTIS; GPO Dep.

The chemical explosion of the NPE was recorded on the surface of Rainier Mesa along the same line which had previously been the site of a high resolution reflection survey. Six three-component accelerometer stations where distributed along the 550 meter line, which was offset about 600 meters from the epicenter of the explosion. The bandwidth of the acceleration data extends to 100 Hz. Even though the separations of the stations was only about 100 meters, the waveforms and the amplitudes exhibited considerable variability, especially for the transverse component of motion. The maximum accelerations ranged between 0.27 g and 1.46 g, with the maximums of the average traces being 0.57 g on the radial component, 0.28 on the transverse component, and 0.50 g on the vertical component. Using the results of the reflection survey to help constrain the velocity model, the acceleration data were inverted to obtain a preliminary estimate of the seismic moment tensor of the NPE. This result is a strong diagnostic for the NPE being an explosion, showing a somewhat asymmetric extensional source with very small shear components. When interpreted in terms of a spectral model and scaling relationships, the isotropic moment tensor indicates a yield of 1.4 kt, an elastic radius of 116 meters and a cavity radius of 15.5 meters. This interpretation includes a source time function which contains appreciable overshoot, and, if shown to be reliable, this feature of the explosion could have a significant effect upon the analyses of other types of seismic data.

8423 **Synthesis of 3,6-diamino-1,2,4,5-tetrazine.** Coburn, M.D.; Ott, D.G. To Dept. of Energy. 1992. Filed date 24 Nov 1992. U.S. Patent Application 7-980,892. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. Order Number DE95006103. Source: OSTI; NTIS (US Sales Only); GPO Dep.

This invention is a method of making 3,6-diamino-1,2,4,5,-tetrazine (compound 5, DATZ), which is useful as a precursor to 3,6-diamino-1,2,4,5,-tetrazine-1,4-dioxide, a new explosive currently being evaluated at Los Alamos National Laboratory. To prepare compound 5, DATZ, triaminoguanidine monohydrochloride (compound 1) in water solution is combined with 2,4-pentanedione (compound 2) to form a precipitate comprised of 3,6-bis(3,5-dimethylpyrazol-1-y1)-1,2- dihydro-1,2,4,5-tetrazine (compound 3). A mixture of compound 3 in a suitable solvent is contracted with nitric oxide (NO) or nitrogen dioxide (NO_2) to form 3,6-bis(3,5-dimethylpyrazol-1-y1)-1,2,4,5- tetrazine (compound 4). The NO or NO_2 is then removed from the mixture by passing an inert gas through the mixture or, alternatively, compound 4 is separated from the mixture and mixed with fresh solvent to form a mixture free of NO and NO_2. The mixture is contacted with ammonia (NH_3), first at a temperature below about 35 C and then at a temperature above about 50 C, to form 3,6-diamino-1,2,4,5-tetrazine and 3,5-dimethyl-1H-pyrazole (compound 7). A preferred solvent is 1-methyl-2-pyrrolidinone (NMP).

8424 (SAND–94-1990C) **Crushable structure performance determined from reconstructed dynamic forces during impact tests.** Bateman, V.I. Sandia National Labs., Albuquerque, NM (United States). [1995]. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. (CONF-9410187–4: Shock and vibration symposium, San Diego, CA (United States), 31 Oct 1994). Order Number DE95004545. Source: OSTI; NTIS; GPO Dep.

A force reconstruction technique has been used to assess the dynamic performance of a crushable structure (a bomb nose) in both the axial (90°) and slapdown (30°) impact conditions. The dynamic force characteristics for the nose design, determined from these test results, have been used to write a dynamic force specification for a new nose design that will replace the old nose. The dynamic forces are reconstructed from measured acceleration responses with the Sum of Weighted Accelerations Technique (SWAT) developed at Sandia National Laboratories. Axial characterizations for the old nose are presented from tests at two SNL facilities: a rocket rail launcher facility and an 18-Inch horizontal actuator facility. The characterizations for the old nose are compared to the characterizations for two new nose designs. Slapdown characterizations for the old nose are presented. Incorporation of the test results into a dynamic force specification is discussed.

4502 Nuclear Explosions and Explosives

Refer also to citation(s) 7479, 8421, 8435, 8472, 8473, 9195

8425 (SAND–94-3252) **Violent reaction source term study.** Sagartz, M.J. Sandia National Labs., Albuquerque, NM (United States). Jan 1995. 17p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. Order Number DE95005913. Source: OSTI; NTIS; GPO Dep.

Six explosive "source term" tests involving progressively milder explosions were conducted in the aerosol test facility of Department 9614. The tests were designed to simulate a low order initiation of the high explosive in a nuclear weapon primary. All of the tests involved spherical shells of explosive, detonated at one point, imploding a thin sterling silver spherical shell. The amount of silver aerosolized in the test was determined by sampling the atmosphere in the test chamber after the explosion. Numerical simulations of the tests were done using the CTH shockwave code. Results of these calculations show that in all cases the imploding silver impacts at a central point into an almost solid metal mass. The impact heats the silver, melting a fraction of the material and, sometimes, also vaporizing some material. The amount of aerosolized silver appears to be related to the amount of melted material, which decreased dramatically for the more mild explosive tests.

8426 (UCRL-ID–119479) **KERNVILLE, containment data report.** Hudson, B.; Stubbs, T.; Heinle, R. Lawrence Livermore National Lab., CA (United States). Dec 1994. 26p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. Order Number DE95005659. Source: OSTI; NTIS; GPO Dep.

The KERNVILLE experiment was executed in Hole U20ar of the Nevada Test Site at 10:10 PST on February 15, 1988, on the Pahute Mesa. All early phenomena observed appeared normal, however, cavity collapse reached the ground surface producing a crater having a mean radius of about 61 m and a maximum depth of about 12 m. No radiation arrivals were detected; the KERNVILLE event containment was considered satisfactory.

8427 (UCRL-ID–119551) **HAZEBROOK, containment data report.** Hudson, B.; Stubbs, T.; Heinle, R. Lawrence Livermore National Lab., CA (United States). Dec 1994. 44p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. Order Number DE95005660. Source: OSTI; NTIS; GPO Dep.

The HAZEBROOK event was detonated in hole U10bh of the Nevada Test Site. Detonation time was 7:20 AM PST on February

3, 1987. No subsidence was observed. Radiation arrivals were detected to a depth of 122 m in the emplacement hole; however, no radiation was detected above ground. The HAZEBROOK event containment was satisfactory.

4503 Nuclear Explosion Detection

8428 (LBL–35944) **High resolution seismic imaging of Rainier Mesa using surface reflection and surface to tunnel tomography.** Majer, E.L.; Johnson, L.R.; Karageorgi, E.K.; Peterson, J.E. Lawrence Berkeley Lab., CA (United States). Jun 1994. 9p. Sponsored by USDOE, Washington, DC (United States);Department of Defense, Washington, DC (United States). DOE Contract AC03-76SF00098. DOD Contract F49620-94-1-0197. (CONF-9404100–14: Symposium on the non-proliferation experiment results and implications for test ban treaties, Rockville, MD (United States), 19-21 Apr 1994). Order Number DE95003441. Source: OSTI; NTIS; GPO Dep.

In the interpretation of seismic data to infer properties of an explosion source, it is necessary to account for wave propagation effects. In order to understand and remove these propagation effects, it is necessary to have a model. An open question concerning this matter is the detail and accuracy which must be present in the velocity model in order to produce reliable estimates in the estimated source properties. While it would appear that the reliability of the results would be directly related to the accuracy of the velocity and density models used in the interpretation, it may be that certain deficiencies in these models can be compensated by the and amount of seismic data which is used in the inversion. The NPE provided an opportunity to test questions of this sort. In August 1993, two high resolution seismic experiments were performed in N-Tunnel and on the surface of Rainier Mesa above it. The first involved a surface-to-tunnel imaging experiment with sources on the surface and receivers in tunnel U12n.23 about 88 meters west of the NPE. It was possible to estimate the apparent average velocity between the tunnel and the surface. In a separate experiment, a high resolution reflection experiment was performed in order to image the lithology in Rainier Mesa. Good quality, broad band, reflections were obtained from depths extending into the Paleozoic basement. A high velocity layer near the surface is underlain by a thick section of low velocity material, providing a nonuniform but low average velocity between the depth of the NPE and the surface.

8429 (UCRL-CR–116651) **A study of small explosions and earthquakes during 1961–1989 near the Semipalatinsk Test Site, Kazakhstan.** Khalturin, V.I. (Russian Academy of Sciences, Moscow (Russian Federation). Inst. of Physics of the Earth); Rautian, T.G.; Richards, P.G. Lawrence Livermore National Lab., CA (United States). Mar 1994. 64p. Sponsored by USDOE, Washington, DC (United States);Department of Defense, Washington, DC (United States). DOE Contract W-7405-ENG-48. DOD Grant F49620-92-J-0497. Order Number DE95005994. Source: OSTI; NTIS; INIS; GPO Dep.

Several Russian sources have stated that 343 underground nuclear explosions were conducted during 1961–1989 at the Semipalatinsk Test Site. However, only 282 of them appear to have been described, in the openly available technical literature, with well-determined coordinates; and only 272 have both good locations and magnitudes. The authors have used regional data from 52 stations to study 65 seismic sources initially thought to be in or near the Semipalatinsk region, additional to the 272 underground nuclear explosions with known locations and magnitudes. Of these 65 events, the authors believe 8 are not explosions on the test site, namely: two earthquakes close to the test site; three earthquakes or chemical explosions 100–300 km from the test site; and three events at greater distances from Semipalatinsk. Of the remaining 57 events: 10 were known to be underground nuclear explosions with known locations and the authors have supplied magnitudes where none were previously available; one was a chemical explosion at Degelen; they believe 21 were underground nuclear explosions; 13 were chemical explosions at Balapan; 8 were chemical explosions elsewhere on the test site; three were either nuclear or chemical explosions; and one was either a chemical explosion or a cavity collapse. The largest magnitude of their 44 possible underground nuclear explosions is around 5 (February 4, 1965, obscured at many teleseismic stations by a large Aleutian earthquake). Others lie in the magnitude range 3.5–4.5, and clearly most have sub kiloton yields. Their data set of small events is important for purposes of evaluating the detection capability of teleseismic arrays, and the detection and identification capability of regional stations.

54 ENVIRONMENTAL SCIENCES

Refer also to citation(s) 8154

5401 Environmental Sciences, Atmospheric

Refer also to citation(s) 7140, 7150, 7181, 7183, 7291, 7453, 7457, 7459, 7461, 7462, 7637, 7753, 7756, 7760, 7841, 7849, 7850, 7861, 7862, 7951, 7994, 8002, 8003, 8015, 8016, 8023, 8032, 8033, 8034, 8035, 8498, 8518, 8548, 8585, 8638, 9194

8430 (ANL/MCS-TM–186) **Computational load in model physics of the parallel NCAR community climate model.** Michalakes, J.G.; Nanjundiah, R.S. Argonne National Lab., IL (United States). Nov 1994. 14p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. Order Number DE95005410. Source: OSTI; NTIS; GPO Dep.

Maintaining a balance of computational load over processors is a crucial issue in parallel computing. For efficient parallel implementation, complex codes such as climate models need to be analyzed for load imbalances. In the present study we focus on the load imbalances in the physics portion of the community climate model's (CCM2) distributed-memory parallel implementation on the Intel Touchstone DELTA computer. We note that the major source of load imbalance is the diurnal variation in the computation of solar radiation. Convective weather patterns also cause some load imbalance. Land-ocean contrast is seen to have little effect on computational load in the present version of the model.

8431 (BNL–61230) **Microphysical and compositional influences on shortwave radiative forcing of climate by sulfate aerosols.** Schwartz, S.E.; Wagener, R.; Nemesure, S. Brookhaven National Lab., Upton, NY (United States). [1995]. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-950402–3: 209. American Chemical Society national meeting, Anaheim, CA (United States), 2-7 Apr 1995). Order Number DE95005999. Source: OSTI; NTIS; INIS; GPO Dep.

Anthropogenic sulfate aerosols scatter shortwave (solar) radiation iincident upon the atmosphere, thereby exerting a cooling influence on climate relative to pre-industrial times. Previous estimates of this forcing place its global and annual average value at about -1 W M^{-2}, uncertain to a factor of somewhat more than 2, comparable in magnitude to greenhouse gas forcing over the same period but opposite in sign and much more uncertain. Key sources of uncertainty are atmospheric chemistry factors (yield, residence time), and microphysical factors (scattering efficiency, upscatter fraction, and the dependence of these quantities on particle size and relative humidity, RH). This paper examines these microphysical influences to indentify properties required to obtain more a accurate description of this forcing. The mass scattering efficiency exhibits a maximum at a particle diameter ($\sim$0.5 μm) roughly equal to the wavelength of maximum power in the solar spectrum and roughly equal to diameter typical of anthropogenic sulfate aerosols. Particle size, and hence mass scattering efficiency, increase with increasing on RH because of accretion of water by deliquescent salt aerosols.

8432 (DOE/CE/23810–48) **Materials compatibility and lubricants research on CFC-refrigerant substitutes. Quarterly MCLR program technical progress report, 1 July 1994–30 September 1994.** Szymurski, S.R.; Hawley, M.; Hourahan, G.C.; Godwin, D.S. Air-Conditioning and Refrigeration Technology Inst., Inc., Arlington, VA (United States). Nov 1994. 91p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-91CE23810. Order Number DE95005451. Source: OSTI; NTIS; GPO Dep.

The Materials Compatibility and Lubricants Research (MCLR) program supports critical research to accelerate the introduction of CFC and HCFC refrigerant substitutes. The MCLR program addresses refrigerant and lubricant properties and materials compatibility. The primary elements of the work include data collection and dissemination, materials compatibility testing, and methods development. The work is guided by an Advisory Committee consisting of technical experts from the refrigeration and air-conditioning industry and government agencies. The Air-Conditioning and Refrigeration Technology Institute, Inc., (ARTI) manages and contracts multiple research projects and a data collection and dissemination effort. Detailed results from these projects are reported in technical reports prepared by each subcontractor.

8433 (DOE/ER/61364–3) **Use of cloud observations and mesoscale meteorology models to evaluate and improve cloud parameterizations. Technical progress report, 1 October 1993–30 December 1994.** Walcek, C.J. State Univ. of New York, Albany, NY (United States). Atmospheric Sciences Research Center. 28 Dec 1994. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-92ER61364. Order Number DE95006256. Source: OSTI; NTIS; GPO Dep.

The main goal of this research effort is to improve methods for calculating cloud cover within climate models. Until now, cloud cover and heights have been diagnosed from the US Air Force RTNEPH and 3DNEPH archive, and recently, CART measurements are available for analysis. Improved cloud cover formulations have been compared with existing climate model algorithms. The authors earlier conclusions were that relative humidity and convective potential were the strongest factors influencing cloud cover on regional scales. Therefore, they are refining and validating an innovative Single Column Model (SCM) cumulus parameterization for calculating heating and moistening tendencies, and precipitation rates attributable to subgrid-scale convection not resolved by climate models. This SCM will be tested and evaluated using tropical convective measurements (GATE) and they will also be applied to the incoming measurements from the Oklahoma ARM site. Further development and testing of this SCM will improve their ability to predict convective effects and cloud cover in climate models. They will quantify the influence of convection on cloud cover using convective measures derived from this SCM. The output of this research will be a family of validated algorithms for assessing cloud cover under a variety of stable, unstable, continental or oceanic conditions, and an improved cumulus parameterization scheme.

8434 (DOE/ID–10437(93)) **Air Emission Inventory for the Idaho National Engineering Laboratory, 1993 emissions report.** Department of Energy, Idaho Falls, ID (United States). Idaho Operations Office. Jun 1994. 320p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC07-76ID01570. Order Number DE95005045. Source: OSTI; NTIS; INIS; GPO Dep.

This report presents the 1993 update of the Air Emission Inventory for the Idaho National Engineering Laboratory (INEL). The purpose of the Air Emission Inventory is to commence the preparation of the permit to operate application for the INEL, as required by the recently promulgated Title V regulations of the Clean Air Act. The report describes the emission inventory process and all of the sources at the INEL and provides emissions estimates for both mobile and stationary sources.

8435 (DOE/NV/10845–42) **Community radiation monitoring program. Annual report, October 1, 1992–September 30, 1993.** Cooper, E.N. Nevada Univ., Las Vegas, NV (United States). Water Resources Center. Aug 1994. 115p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC08-90NV10845. Order Number DE95005667. Source: OSTI; NTIS; INIS; GPO Dep.

The Community Radiation Monitoring Program (CRMP) is a cooperative effort between the US Department of Energy (DOE), the US Environmental Protection Agency (EPA), the Desert Research Institute (DRI), a division of the University and Community College System of Nevada, and the Nuclear Engineering Laboratory of the University of Utah (UUNEL). The thirteenth year of this program began in the fall of 1992, and the work continues as an integral part of the DOE–sponsored long-term offsite radiological monitoring effort that has been conducted by EPA and its predecessors since the inception of nuclear testing at the Nevada Test Site (NTS). The CRMP began by enhancing and centralizing environmental monitoring and sampling equipment at 15 communities in the then-existing EPA monitoring network around the NTS, and has since expanded to 19 locations in Nevada, Utah, and California. The primary objectives of this program are still to increase the understanding by the people who live in the area surrounding the NTS of the activities for which DOE is responsible, to enhance the performance of radiological sampling and monitoring, and to inform all concerned of the results of these efforts. One of the primary methods used to improve the communication link with the people in the potentially impacted area has been the hiring and training of local citizens as Station Managers and program representatives in those selected communities in the offsite area. These mangers, active science teachers wherever possible, have succeeded through their training, experience, community standing, and effort in becoming a very visible, able, and valuable asset in this link.

8436 (DOE/PC/91293–12) **Direct catalytic decomposition of nitric oxide. Quarterly technical progress report number 12, July–September, 1994.** Flytzani-Stephanopoulos, M. (Tufts Univ., Medford, MA (United States). Dept. of Chemical Engineering); Sarofim, A.F.; Zhang, Y. Massachusetts Inst. of Tech., Cambridge, MA (United States). Dept. of Chemical Engineering. [1994]. 35p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG22-91PC91293. Order Number DE95005202. Source: OSTI; NTIS; GPO Dep.

This project investigates a suitable catalyst system for the direct NO decomposition in post-combustion NO_x control. The process does not use a reductant, such as ammonia used in the case of Selective Catalytic Reduction (SCR) of NO_x to nitrogen. Therefore, it is a greatly simplified process basically involving passing the flue gas through a catalytic converter. Catalysts are prepared by incorporating metal cations into zeolite supports according to ion exchange procedures widely used in preparation of metal/zeolite catalysts. Particular emphasis is given in this work on promoted Cu-exchanged zeolites, especially the catalysts Mg/Cu-ZSM-5 and Ce/Cu-ZSM-5, which are promising for NO conversion to nitrogen at typical flue gas O_2 and NO levels and over the temperature range of 723–873 K. Effects of zeolite modification, copper exchange level and catalyst preparation conditions on the catalyst activity are studied in a packed-bed microreactor. Kinetic and selectivity studies are conducted over a wide range of P_{NO}/P_{O_2} and temperature with promoted and unpromoted Cu-ZSM-5. Structural characterization of the catalyst employs STEM/EDX analysis, XRD, XPS, EPR and luminescence analyses. A combination of techniques, including ^{27}Al NMR was used to identify the stabilization role of Ce^{3+} in Cu-ZSM-5 under wet NO decomposition conditions. This quarterly report is in the form of a manuscript to be submitted for publication, entitled "Positive effect of cocations in Cu-ZSM-5 on the activity of nitric oxide decomposition in the presence of water."

8437 (FAAR–23/1993) **Report series in aerosol science.** Haemeri, K.; Mikkanen, P.; Kauppinen, E. (eds.). Finnish Association for Aerosol Research, Espoo (Finland); Technical Research Centre of Finland, Espoo (Finland). Aerosol Technology Group. 1993. 292p. (CONF-9306401–: 5. Finnish national aerosol symposium, Espoo (Finland), 1-3 Jun 1993). Order Number DE95737628. Source: OSTI; NTIS.

The Fifth Finnish Aerosol Symposium is held in June 1-3, 1993. Symposium is jointly organized by FAAR (Finnish Association for Aerosol Research), Aerosol Technology Group of Technical Research Centre of Finland and Helsinki University, Department of Physics. Aerosols, the suspensions of solid and liquid particles and gases, are receiving increasing importance in many areas of science and technology. These include industrial hygiene, ambient and indoor air pollution, pollution control technologies, cloud physics, nuclear safety engineering, combustion science and engineering, clean manufacturing technologies and material processing. The importance of aerosol issues during the development of advanced fuel conversion and material processing technologies can be realized when looking at the numerous papers presented on these topics at the Symposium.

8438 (FAAR–23/1993, pp. 48-53) **A model for gas exchange through stomata.** Vesala, T. (Helsinki Univ. (Finland).

Dept. of Physics); Kulmala, M.; Lushnikov, A.A.; Hari, P. Finnish Association for Aerosol Research, Espoo (Finland). 1993. (CONF-9306401–: 5. Finnish national aerosol symposium, Espoo (Finland), 1-3 Jun 1993). In *Report series in aerosol science.* 292p. Order Number DE95737628. Source: OSTI; NTIS.

Ordinary diffusion of gases from (or into) a sub-stomatal cavity through a stomatal pore into (or from) the ambient air is considered. The formulation of molar flux densities for trace components (CO_2 and e.g. gaseous pollutants) includes the coupling between transport of water vapour. Analytical molar flux expressions are presented in terms of the concentration difference between the cavity and the ambient air. The correction factors for the influence of a steady wind and the interference between pores are presented. The interference is found to be important once stomata were not almost closed. The wind reduces the interference. The direct effect of water vapour diffusion on the transport of trace gases is shown to be marginal. (orig.)

8439 (FAAR–23/1993, pp. 59-64) **The structure of combustion-generated aerosol particles.** Sarofim, A.F. (Massaschusetts Inst. of Technology, Cambridge, MA (United States). Dept. of Chemical Engineering); Helble, J.J. Finnish Association for Aerosol Research, Espoo (Finland). 1993. (CONF-9306401–: 5. Finnish national aerosol symposium, Espoo (Finland), 1-3 Jun 1993). In *Report series in aerosol science.* 292p. Order Number DE95737628. Source: OSTI; NTIS.

The presentation will first review the understanding that has developed of the factors that govern the size, shape, and composition of combustion-generated aerosols. It will then provide some suggestions of how this detailed information can be used for diagnostic purposes, and how this effort will require further developments in the analytical tools, experimental and theoretical, provided by the aerosol scientist. Aerosols from combustion sources can be derived from either the inorganic or organic content of fuels and are strongly dependent on fuel type and combustion conditions. In this short review the emphasis will be on the ash derived from coal combustion and the carbonaceous particles, primarily soot and its associated hydrocarbons, from hydrocarbon fuels. The general principles governing the formation of these aerosols, however, apply generally to particles produced by other combustible matter.

8440 (FAAR–23/1993, pp. 105-107) **Theoretical studies on electrical agglomeration of a bimodal aerosol.** Lehtinen, K.E.J. (Technical Research Centre of Finland, Espoo (Finland). Aerosol Technology Group. Nuclear Engineering Lab.); Jokiniemi, K.J.; Kauppinen, E.; Hautanen, J. Finnish Association for Aerosol Research, Espoo (Finland). 1993. (CONF-9306401–: 5. Finnish national aerosol symposium, Espoo (Finland), 1-3 Jun 1993). In *Report series in aerosol science.* 292p. Order Number DE95737628. Source: OSTI; NTIS.

An aerosol with a bimodal mass distribution m(d) and charge distribution q(d) flows into an alternating electric field $E = E_0 \cos(2\pi f t)$ with constant gas velocity. The fine particle mode has a mass median diameter in the range 0.05-0.5πm and the large particle mode > 1μm respectively. The reason for our interest to remove the fine mode particles is that this mode represents the range where most flue gas cleaning methods have deficiencies. The particles start to oscillate with velocities and amplitudes depending on particle size: The fine particles remain almost still when compared to the larger oscillating amplitude of the large particles. This causes coagulation. The aim is to solve the coagulation efficiency i.e. to find out the amount of mass in the fine mode that is removed by coagulation with the large mode.

8441 (FAAR–23/1993, pp. 118) **Electrical agglomeration of aerosol particles.** Hautanen, J. (Tampere Univ. of Technology (Finland). Dept. of Physics); Kilpelaeinen, M.; Kauppinen, E.; Jokiniemi, J.; Lehtinen, K. Finnish Association for Aerosol Research, Espoo (Finland). 1993. (CONF-9306401–: 5. Finnish national aerosol symposium, Espoo (Finland), 1-3 Jun 1993). In *Report series in aerosol science.* 292p. Order Number DE95737628. Source: OSTI; NTIS.

Short communication AEROSOLS/agglomeration; AEROSOLS; AGGLOMERATION; PARTICLES; FLY ASH; ELECTROSTATIC PRECIPITATORS; ELECTRIC FIELDS; VELOCITY

8442 (FAAR–23/1993, pp. 132-137) **Effects of nitric acid vapour on the radiative properties of convective clouds.** Korhonen, P. (Helsinki Univ. (Finland). Dept. of Physics); Kulmala, M.; Laaksonen, A.; Vesala, T.; Savijaervi, H. Finnish Association for Aerosol Research, Espoo (Finland). 1993. (CONF-9306401–: 5. Finnish national aerosol symposium, Espoo (Finland), 1-3 Jun 1993). In *Report series in aerosol science.* 292p. Order Number DE95737628. Source: OSTI; NTIS.

Effects of nitric acid vapour on the cloud droplet distribution have been simulated with a one-dimensional convective cloud model. Changes in the shortwave radiative properties caused by changes in the droplet distribution are calculated and results compared in different cases. Possible effects on global shortwave properties are discussed. (orig.)

8443 (FAAR–23/1993, pp. 138-143) **Polar stratospheric cloud formation: Nucleation and freezing mechanisms of nitric acid and sulphuric acid aerosols.** Laaksonen, A. (Helsinki Univ. (Finland). Dept. of Physics); Kulmala, M.; McKenzie, A.R. Finnish Association for Aerosol Research, Espoo (Finland). 1993. (CONF-9306401–: 5. Finnish national aerosol symposium, Espoo (Finland), 1-3 Jun 1993). In *Report series in aerosol science.* 292p. Order Number DE95737628. Source: OSTI; NTIS.

Nucleation theory may usefully serve as a guide to which of the possible pathways are at all probable. In this work we study theoretically both the homogeneous and heterogeneous freezing of SAT (sulphur acid trihydrate) and NAT (nitric acid trihydrate) from sulphuric acid and nitric acid water solutions have been studied, and estimate the maximum supercoolings of the liquid phases has been estimated. We also investigate the relative importance of the various possible nucleation mechanisms of SBS (supercooled binary HNO_3-H_2O solution), NAT, and NAD (nitric acid dihydrate) on stratospheric SAT particles have been investigated.

8444 (FAAR–23/1993, pp. 149-154) **Correlations between CN and SO_2 concentrations at Vaerriae research station.** Ahonen, T. (Helsinki Univ. (Finland). Dept. of Physics); Aalto, P.; Korhonen, P.; Haemeri, K.; Kulmala, M.; Hari, P. Finnish Association for Aerosol Research, Espoo (Finland). 1993. (CONF-9306401–: 5. Finnish national aerosol symposium, Espoo (Finland), 1-3 Jun 1993). In *Report series in aerosol science.* 292p. Order Number DE95737628. Source: OSTI; NTIS.

This work includes some results of the examination of observations made at Vaerriae research station in Eastern Lapland. Surface ozone, CN, SO_2 and CO_2 profiles, temperature, sun radiation, pressure, wind speed, wind direction, humidity during warm period and some other factors are measured continuously at the station. This work is concentrated on finding some relations between different factors by calculating correlation coefficients and classifying data by wind direction. A clear correlation between SO_2 and CN concentrations has been shown in a remote area of northern Finland during pollution events. During a high SO_2 concentration episode the strong correlation can be explained by formation of new particles. However, the results are still preliminary and the final conclusions need still further investigations. In the future wider analysis including the essential photochemistry and aerosol dynamics will be performed in order to indicate the possible homogeneous nucleation events in atmospheric conditions.

8445 (FAAR–23/1993, pp. 155-159) **Comparison of denuder systems, a virtual impactor and a Berner low-pressure impactor for determination of nitrate aerosol.** Pakkanen, T. (Finnish Meteorological Inst., Helsinki (Finland)); Hillamo, R.; Maekinen, M.; Maekelae, T.; Virkkula, A.; Kerminen, V.M. Finnish Association for Aerosol Research, Espoo (Finland). 1993. (CONF-9306401–: 5. Finnish national aerosol symposium, Espoo (Finland), 1-3 Jun 1993). In *Report series in aerosol science.* 292p. Order Number DE95737628. Source: OSTI; NTIS.

In this work six different denuder systems (DS), a virtual impactor (BLPI) and a Berner low-pressure impactor were compared for determination of atmospheric nitrate aerosol. The field experiment was conducted during the Nordic NO_3 and NH_4^+ Gas/particle Intercomparison in Helsinki, 11-22 May, 1992. Six groups from Finland, Sweden, Denmark and Norway participated the intercomparison. The VI collected coarse particles on 47 mm diameter polycarbonate filters (Nuclepore Corp.) and fine particles on 3 μm

pore size, 47 mm teflon filters (Millipore Corp.) and 47 mm, 1 μm pore size nylon back-up filters (Gelman). The nylon filters collected the nitrate evaporated from the teflon filters. The VI collected 21 % and 37 % more nitrate than the denuder systems and the BLPI, respectively. These differences can be explained by evaporation of fine particle nitrate from the BLPI and poor collection of coarse particle nitrate by the denuder systems. The fine particle nitrate evaporation from the BLPI was estimated to be on the average 33 % or 57 % as calculated from the DS values or from the VI, respectively. These conclusions are based on the fact that similar filter packs (teflon filter + nylon filter) in the VI and in a denuder system collected similar amounts of nitrate on the nylon filters. However, since the material of the VI used in this study (stainless steel) was not tested for nitric acid there still is the possibility that some gaseous nitric acid may be collected by the VI nylon filters.

8446 (FAAR–23/1993, pp. 209-213) **On the detection efficiency of ultrafine CNC at 1-3 nm size range.** Mavliev, R. (Siberian Branch of the Russian Academy of Sciences, Novosibirsk (Russian Federation). Inst. of Chemical Kinetics and Combustion); Jokinen, V.; Maekelae, J.M. Finnish Association for Aerosol Research, Espoo (Finland). 1993. (CONF-9306401–: 5. Finnish national aerosol symposium, Espoo (Finland), 1-3 Jun 1993). In *Report series in aerosol science.* 292p. Order Number DE95737628. Source: OSTI; NTIS.

Ultrafine aerosol particles are in central position in several gas-to-particle conversion mechanisms in both atmospheric and industrial processes. In those fields Ultrafine Condensation Nucleus Counter (UFACNC TSI 3025) plays an important role. UFACNC is an instrument for counting ultrafine particles. A study on the UFACNC detection efficiency at 1-10 nm using sulphuric acid particles was performed. To conclude the results, an unexpectedly high detection efficiency has been observed for UFACNC using ultrafine sulphuric acid particles. First of all, there is no theoretical explanation for this neither by diffusion broadening of DMA transfer function nor by activation of ultrafine particles in the CNC. Effect might be caused by ion induced nucleation. Thus, one possibility could be to explain the result by the chemical nature of sulfuric acid. Altogether, to explain all the data up to now seems to require much more attention into reconsideration of theory on heterogeneous nucleation process on the CNC conditions. Observations regarding the differencies in activation between sulfuric acid and sodium chloride particles have been made.

8447 (GKSS–94/E/7) **Release of dinitrous oxide from intertidal sediments - illustrated by the example of the Elbe estuary (Muehlenberger Loch) and coastal tidal region (Koenigshafen/Sylt).** Mathieu, B. GKSS-Forschungszentrum Geesthacht GmbH (Germany). Inst. fuer Chemie; Kiel Univ. (Germany). Mathematisch-Naturwissenschaftliche Fakultaet. 1994. 189p. (In German). Order Number DE95738720. Source: OSTI; NTIS (US Sales Only).

The exchange of nitrous oxide (N_2O) between intertidal sediments and the atmosphere has been measured in situ with a closed chamber technique. 1991/92 in various seasons the N_2O net fluxes at the sampling site in the Elbe estuary (Muehlenberger Loch near Hamburg) directed from sediment to atmosphere ranged from 0.05 to 0.40 μmol.m^{-2}.h^{-1} during the day and to 0.64 μmol.m^{-2}.h^{-1} at night - with one exception in winter, when it was zero. During low tide the high initial N_2O concentration in porewater decreased but no less than 10 to >100 fold supersaturation as nitrate and oxygen profiles were changing. The sandy and nutrient-poor marine sediments of the Koenigshafen on the island of Sylt (North Sea) contained very small amounts of N_2O and seemed in summer to be a sinkl rather than a source for atmospheric N_2O. Incubation of a sediment suspension and of intact cores in the laboratory under defined conditions also showed strong influence of photosynthetic activity and the nitrogen and carbon content of the sediment on microbial nitrification/denitrification rates and thus on N_2O release. (orig.)

8448 (GKSS–94/E/13) **Volatile organic compound control technology by means of membranes.** Ohlrogge, K. GKSS-Forschungszentrum Geesthacht GmbH (Germany). Inst. fuer Chemie. 1994. 16p. Order Number DE95738574. Source: OSTI; NTIS (US Sales Only).

In 1989 the first vapor recovery unit (VRU) based on membrane technology was commissioned for off-gas treatment in a gasoline tank farm. At present 20 membrane VRU's are in operation or in construction phase. The capacity of these units range from 100 to 2000 m^3/h. These are single membrane stages or hybrid systems of a membrane stage combined with a post treatment facility, e.g. catalytic incinerator, gas engine or pressure swing adsorption. Small scale membrane applications such as VOC control equipment at the point of use have obtained a growing acceptance in the chemical and pharmaceutical industry. The developments of the last 5 years and the operating experience of commercialized plants are discussed below. (orig.)

8449 (IA–1486, pp. 109-110) **The use of aircraft for environmental monitoring in nuclear accidents.** Skibin, D. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. ACCIDENTS/aerial monitoring; ACCIDENTS; AERIAL SURVEYING; AIRCRAFT; EARTH ATMOSPHERE; METEOROLOGY; RADIONUCLIDE MIGRATION; TURBULENCE; TURBULENT FLOW

8450 (IA–1486, pp. 110-111) **Applications of collimated airborne monitoring in radiological emergency response.** Pernick, A.; Zafrir, H. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. ACCIDENTS/aerial monitoring; ACCIDENTS; AIRCRAFT; BARIUM 140; CESIUM 137; COMPUTERIZED SIMULATION; ERRORS; FISSION PRODUCT RELEASE; IODINE 131; KRYPTON 88; MASS TRANSFER; METEOROLOGY; MONTE CARLO METHOD; PLUMES; RADIO-RELEASE ANALYSIS; RADIOACTIVE CLOUDS; RADIONUCLIDE MIGRATION; STACK DISPOSAL

8451 (IAEA-TECDOC–721, pp. 181-186) **Oxygen-18 content of modern vegetal organic matter in Senegal; relation with climatic parameters.** Fall, M. (C.A. Diop Univ., Dakar (Senegal). Dept. de Geologie); Faye, A.; Ferhi, A.; Aranyossy, J.F.; Saos, J.L. International Atomic Energy Agency, Vienna (Austria). Oct 1993. (In French). In *Water resources in the Sahel. Hydrogeological and hydrological studies in West Africa by isotopic techniques. Statement of accounts of studies carried out in the framework of the project RAF/8/012: Isotopic hydrology in Sahelian countries.* 211p. Order Number DE95615467. Source: OSTI; NTIS (US Sales Only); INIS.

In Senegal, precipitations present a latitudinal repartition from 1700 mm/year in the south to 300 mm/year in the north. In this context, isotope study of Acacia albida tree-rings, sampled across the rainfall gradient, evidence significant correlation between $\delta^{18}O$ in wood and relative humidity which is directly related to the rainfall, and inversely related to the temperature. Indeed, the Acacia rings $\delta^{18}O$ contains a climatic information reflecting local climate parameters. (author). 18 refs, 5 figs.

8452 (INIS-mf–14416) **Measurement of volumic activities of radon in air in houses and in working rooms with solid state nuclear track detectors.** Hakam, O.K. Universite Mohammed 5, Rabat (Morocco). Faculte des Sciences. 1993. 132p. (In French). Order Number DE95612434. Source: OSTI; NTIS (US Sales Only); INIS.

In this work, a new method of measuring volumic activity of radon has been developed. This method is based on using solid state nuclear track detectors LR-115 type II. It has been applied to measurement of volumic activities of radon in air in houses and in working rooms in different regions of Morocco. These measurements, carried out for the first time in the country, allowed to estimate the dose equivalents of radon received by the population of the studied regions. 59 refs., 38 figs., 38 tabs. (F.M.).

8453 (INIS-mf–14436, pp. O9.1-O9.15) **A new monitoring network in the surroundings of old uranium mine spoil banks in the Pribram district sites.** Hemer, M. (Utvar Hygieny Prace Uranoveho Prumyslu, Kamenna (Czech Republic)); Solnicka, H. No

corporate text available. Oct 1993. 157p. (In Czech). (CONF-9310403–: The mining Pribram in science and technology, Pribram (Czech Republic), 13-16 Oct 1993). In *The mining Pribram in science and technology. Section O: Mining and the environment.* Order Number DE95612417. Source: OSTI; NTIS (US Sales Only); INIS.

The results are given of radioactivity monitoring at air contamination measuring sites in the surroundings of uranium mine spoil banks in the Pribram district. The radionuclide contents of soil and fallout are not significantly different from those at other measuring sites in the Czech Republic. The values of photon dose equivalent rate also approach the all-country averages, except at places where the detector is directly located at the abandoned mine site. (J.B.). 5 tabs., 1 fig., 7 refs.

8454 (INIS-mf–14469, pp. 81-104) **Environmental monitoring at Inshas area.** Abdelfattah, A.T.; Essa, M.W.; Gomaa, M.A. Atomic Energy Establishment, Cairo (Egypt). 1991. 106p. (CONF-9110549–: 2. radiation protection and Civil Defence Department Conference, Cairo (Egypt), 7-16 Oct 1991). In *Radiation Protection and Civil defence Department Conference.* Order Number DE95617966. Source: OSTI; NTIS (US Sales Only); INIS.

Environmental monitoring of radiation level in some food-chain samples, air-particulates and other items carried out in Inshas after 1985 indicates that in the period of Chernobyl accident an increase in the level had been noticed exactly on 10 tenth day of the accident. This has been detected easily in air filters than in other samples. Air-particulate sampling outside the research reactor in Inshas together with other gamma spectroscopic analysis of soil, water and plant samples indicate that the vicinity of the reactor is within the natural background level. Inside the reactor, a noticeable level from radon and/or thoron decay products was found when the ventilation of the reactor hall was switched off. During arabia gulf war (Feb,1991) experimental results indicated no presence of artificial radionuclides (such as I-131 and Cs-134,137) either in the air or in other environmental samples. Measured radioactivity was mainly due to radon and thoron daughters. Meteorological data at Inshas local station indicates that the prevailing wind direction was 295 degree (North-west) which is in agreement with that of Helwan station at high altitudes. It is not expected that this wind direction NE or Se will help in carrying radiation debris or gases to inshass (or egypt). 8 tabs, 5 fig.

8455 (IVL-B–1171) **Emission measurements from a urea-based SCR/oxi catalytic NO_x/HC exhaust gas treatment system on board a diesel powered passenger ferry - operation after 12000 hours service.** Cooper, D.; Peterson, Kjell. Swedish Environmental Research Inst., Goeteborg (Sweden). Jan 1995. 13p. Order Number DE95737681. Source: OSTI; NTIS.

As an extension of a previous study NO_x hydrocarbons (THC), NH_3 and particulate bound NH_4^+, SO_4^{2-}, and H^+ measurements have been carried out on the exhaust of a 2.5 MW medium speed diesel engine on boards 'MS Aurora of Helsingborg' after 12100 hours service. Two operating cases were studied: * with the exhaust gases passing a urea based SCR/oxi catalyst system (NIXHAUST), and * with the exhaust gases by-passing the NIXHAUST system (baseline case). With normal urea dosage, the NIXHAUST system reduced NO_x levels by 98% and THC by 85% with low NH_3 slip (< 4 ppm). Even with lower urea dosages (90% and 80% of normal) the high reductions were maintained without NH_3 slip penalties. In addition, no NH_4HSO_4 was detected in the particulate fraction of the exhaust at the measurement site. In comparison with the results from earlier measurement campaigns after 800 and 6000 hours operation, individual emission factors have varied somewhat (engine wear, engine service etc.) but the reduction efficiencies with the NIXHAUST system obtained have not altered significantly. 11 refs, 2 figs, 8 tabs

8456 (KE–93006B) **Investigation of technologies for CO_2 separation, fixation and disposal for the prevention of global warming.** Son, Y.M. (Korea Institute of Energy Research, Taejon (Korea, Republic of)); Auh, J.M.; Son, J.E.; Sim, K.S.; Kim, S.H.; Kim, J.W.; Min, B.M.; Park, S.C.; Lee, T.K. No corporate text available. Dec 1993. 164p. (In Korean). Order Number DE95744285. Source: OSTI; NTIS (US Sales Only).

Scientific accessments of global warming, which were discussed at various international forums, conferences and meetings, were introduced in this work. Also, various technologies of carbon dioxide treatment were investigated in order to study technical options for the prevention of global warming related on energy consumption. (author). refs., figs., tabs.

8457 (KE–93041G) **A Study on Environmental Pollution Control in the Energy Field.** Son, J.I. (Korea Institute of Energy Research, Taejon (Korea, Republic of)); Son, Y.M.; Kim, S.H.; Sim, K.S.; Min, B.M.; Lee, H.K.; Kim, Y.S.; Kim, C.H.; Choi, W.K.; Park, S.D.; Baik, I.H.; Cho, S.H. No corporate text available. Dec 1993. 304p. (In Korean). Order Number DE95743536. Source: OSTI; NTIS (US Sales Only).

In 1992, emission characteristics of environmental pollutants and carbon dioxide which effect on the global warming were qualitively analysed and set up the direction for the environmental pollution reduction strategy in the domestic energy field. From these basis, in 1993, more detailed environmental pollution reduction strategy were quantitatively reviewed. The emission control strategy of sulfur dioxide and nitrogen oxides which effect on acid rain, particulates and carbon dioxide emitted from energy field were reviewed to meet the emission standards and control levels. Especially, In this project, the reduction strategy of carbon dioxide emission and the separation technology from the flue gas in develope countries were investigated to apply the domestic cases. The technical and economical characteristics of carbon dioxide recovery processes which can be separated from flue gas were evaluated and mathematical model for fixed bed adsorber was investigated to separate from mixed gas with adsorption principles.(author). refs. and figs.

8458 (LA–12814-MS) **Parallel processing of atmospheric chemistry calculations: Preliminary considerations.** Elliott, S.; Jones, P. Los Alamos National Lab., NM (United States). Jan 1995. 29p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. Order Number DE95005915. Source: OSTI; NTIS; GPO Dep.

Global climate calculations are already saturating the class modern vector supercomputers with only a few central processing units. Increased resolution and inclusion of routines to deal with biogeochemical portions of the terrestrial climate system will soon demand massively parallel approaches. The atmospheric photochemistry ensemble is intimately linked to climate through the trace greenhouse gases ozone and methane and modules for representing it are being attached to global three dimensional transport and GCM frameworks. Atmospheric kinetics involve dozens of highly interactive tracers and so will accentuate the need for parallel processing of earth system simulations. In the present text we lay some of the groundwork for addition of atmospheric kinetics packages to GCM and global scale atmospheric models on multiply parallel computers. The discussion is tailored for consumption by the photochemical modelling community. After a review of numerical atmospheric chemistry methods, we examine how kinetics can be implemented on a parallel computer. We concentrate especially on data layout and flexibility and how these can be implemented in various programming models. We conclude that chemistry can be implemented rather easily within existing frameworks of several parallel atmospheric models. However, memory limitations may preclude high resolution studies of global chemistry.

8459 (LA-UR–94-3637) **Radon monitoring using long-range alpha detector-based technology.** Bolton, R.D. Los Alamos National Lab., NM (United States). [1994]. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-941061–6: Nuclear science symposium: medical imaging conference, Norfolk, VA (United States), 30 Oct - 5 nov 1994). Order Number DE95002729. Source: OSTI; NTIS; INIS; GPO Dep.

Long-Range Alpha Detector (LRAD) technology is being studied for monitoring radon gas concentrations. LRAD-based instruments collect and measure the ionization produced in air by alpha decays. These ions can be moved to a collection grid via electrostatic ion-transport design collected approximately 95% of the radon produced ions, while instruments using an airflow transport design collected from 44% to 77% of these ions, depending on detector

geometry. The current produced by collecting this ionization is linear with respect to ^{222}Rn concentration over the available test range of 0.07 to 820 pCi/L. In the absence of statistical limitations due to low radon concentrations, the speed of response of LRAD-based instruments is determined by the air exchange rate, and therefore changes in radon concentration can be detected in just a few seconds. Recent tests show that at radon concentrations below 20 pCi/L current pulses produced by individual alpha decays can be counted, thus improving detector sensitivity and stability even further. Because these detectors are simple, rugged, and do not consume much power, they are natural candidates for portable, battery operation.

8460 (LBL–34244-Rev.) **Toward resolving model-measurement discrepancies of radon entry into houses.** Garbesi, K. (Univ. of California, Berkeley, CA (United States). Energy and Resources Group). Lawrence Berkeley Lab., CA (United States). Oct 1994. 169p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00098. Order Number DE95004675. Source: OSTI; NTIS; INIS; GPO Dep.

Analysis of the literature indicated that radon transport models significantly and consistently underpredict the advective entry into houses of soil-gas borne radon. Advective entry is the dominant mechanism resulting in high concentrations of radon indoors. The author investigated the source of the model-measurement discrepancy via carefully controlled field experiments conducted at an experimental basement located in natural soil in Ben Lomond, California. Early experiments at the structure confirmed the existence and magnitude of the model-measurement discrepancy, ensuring that it was not merely an artifact of inherently complex and poorly understood field sites. The measured soil-gas entry rate during structure depressurization was found to be an order of magnitude larger than predicted by a current three-dimensional numerical model of radon transport. The exact magnitude of the discrepancy depends on whether the arithmetic or geometric mean of the small-scale measurements of permeability is used to estimate the effective permeability of the soil. This factor is a critical empirical input to the model and was determined for the Ben Lomond site in the typical fashion using single-probe static depressurization measurements at multiple locations. The remainder of the dissertation research tests a hypothesis to explain the observed discrepancy: that soil permeability assessed using relatively small-scale probe measurements does not reflect bulk soil permeability for flows that is likely to occur at larger scales of several meters or more in real houses and in the test structure. The idea is that soil heterogeneity is of a nature that, as flows occur over larger scales, larger scales of heterogeneity are encountered that facilitate larger flux rates, resulting in a scale dependence of effective soil permeability.

8461 (LBL–36379) **Toxic volatile organic compounds in environmental tobacco smoke: Emission factors for modeling exposures of California populations.** Daisey, J.M. (Lawrence Berkeley Lab., CA (United States)); Mahanama, K.R.R.; Hodgson, A.T. Lawrence Berkeley Lab., CA (United States); California State Air Resources Board, Sacramento, CA (United States). Oct 1994. 109p. Sponsored by USDOE, Washington, DC (United States);California State Government, Sacramento, CA (United States). DOE Contract AC03-76SF00098. ARB Contract Number A133-186. Order Number DE95006717. Source: OSTI; NTIS; GPO Dep.

The primary objective of this study was to measure emission factors for selected toxic air contaminants in environmental tobacco smoke (ETS) using a room-sized environmental chamber. The emissions of 23 volatile organic compounds (VOCs), including, 1,3-butadiene, three aldehydes and two vapor-phase N-nitrosamines were determined for six commercial brands of cigarettes and reference cigarette 1R4F. The commercial brands were selected to represent 62.5% of the cigarettes smoked in California. For each brand, three cigarettes were machine smoked in the chamber. The experiments were conducted over four hours to investigate the effects of aging. Emission factors of the target compounds were also determined for sidestream smoke (SS). For almost all target compounds, the ETS emission factors were significantly higher than the corresponding SS values probably due to less favorable combustion conditions and wall losses in the SS apparatus. Where valid comparisons could be made, the ETS emission factors were generally in good agreement with the literature. Therefore, the ETS emission factors, rather than the SS values, are recommended for use in models to estimate population exposures from this source. The variabilities in the emission factors (μg/cigarette) of the selected toxic air contaminants among brands, expressed as coefficients of variation, were 16 to 29%. Therefore, emissions among brands were Generally similar. Differences among brands were related to the smoked lengths of the cigarettes and the masses of consumed tobacco. Mentholation and whether a cigarette was classified as light or regular did not significantly affect emissions. Aging was determined not to be a significant factor for the target compounds. There were, however, deposition losses of the less volatile compounds to chamber surfaces.

8462 (NREL/TP–433-6943) **Review of research results for the photocatalytic oxidation of hazardous wastes in air.** Nimlos, M.R.; Wolfrum, E.J.; Gratson, D.A.; Watt, A.S.; Jacoby, W.A.; Turchi, C. National Renewable Energy Lab., Golden, CO (United States). Jan 1995. 53p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC36-83CH10093. Order Number DE95004004. Source: OSTI; NTIS; GPO Dep.

Laboratory experiments of gas-phase photocatalytic oxidation (PCO) at NREL have focused on measurements that can help commercialize this technology for treating gaseous air streams. This effort proceeds earlier NREL work and studies conducted elsewhere which demonstrated the general applicability of PCO. The more recent work has concentrated on: (1) the kinetics of the PCO process; (2) the formation and destruction of intermediates; and (3) possible enhancements to improve the destruction rates. The results from these studies will be used to help design large scale PCO equipment and they will be used to evaluate the economics of the PCO process. For trichloroethylene and ethanol, extensive studies of the rates of destruction have yielded kinetic parameters for the destruction of intermediates as well as the substrate. The kinetics of intermediates is essential for sizing a large scale reactor, as complete conversion to carbon dioxide is often desired. The kinetic data from these laboratory studies has been used for analyzing IT's pilot PCO reactor and has been used to suggest modifications to this unit. For compounds that are more difficult to destroy (such as the components of BTEX), rate enhancement experiments have been conducted. These compounds represent a very large market for this technology and improvement of the rate of the process should make it competitive. Towards this goal, the enhancement of the destruction of BTEX components have been studied. Experiments have demonstrated that there is a significant increase in the rates of destruction of BTEX with the addition of ozone. Preliminary economic assessments have shown that PCO with ozone may be cost competitive. Future laboratory experiments of PCO will focus on refinements of what has been learned. Rate measurements will also be expanded to include other compounds representing significant markets for the PCO technology.

8463 (NREL/TP–471-7262) **Overview of solar detoxification activities in the United States.** Mehos, M.; Williams, T.; Turchi, C. National Renewable Energy Lab., Golden, CO (United States). Oct 1994. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC36-83CH10093. Order Number DE95000264. Source: OSTI; NTIS; GPO Dep.

The U.S. Department of Energy, through the National Renewable Energy Laboratory (NREL) and Sandia National Laboratories, has been investigating a process that uses solar energy to destroy hazardous wastes in air and water. The process, photocatalytic oxidation, uses ultraviolet light in conjunction with the semiconductor titanium dioxide to generate highly reactive hydroxyl radicals. Early research and development activities have demonstrated that photocatalysis may be cost effective for some applications. The Department of Energy is currently working to establish a commercial industry that uses solar energy to destroy hazardous wastes in air, water, and soil. To achieve this objective, NREL and Sandia are bringing together environmental firms, solar manufacturers, and organizations that have waste or remediation problems.

8464 (PNL-SA–24394) **Extraction and detection of pesticide residues from air filter inserts using supercritical carbon dioxide.** Zemanian, T.S.; Robins, W.H.; Lee, R.N.; Wright, B.W.

Pacific Northwest Lab., Richland, WA (United States). Oct 1994. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-9410114–5: 3. international symposium on supercritical fluids, Strasbourg (France), 17-19 Oct 1994). Order Number DE95004579. Source: OSTI; NTIS; GPO Dep.

Trace quantities of airborne herbicide residues were collected on adsorbent bed cartridges and were subsequently extracted from the adsorbent using supercritical carbon dioxide. An apparatus was constructed to facilitate the extraction and recovery of the desired analytes. The resulting extracts were analyzed using gas chromatography/mass spectrometry (GC/MS) or high performance liquid chromatography (HPLC) techniques. Results are presented for a series of analytes representative of common commercial pesticides or herbicides.

8465 (RPII–94/3) **Radon in dwellings in selected areas of Ireland.** Madden, J.S. (Radiological Protection Inst. of Ireland (Ireland)); Duffy, J.T.; Mackin, G.A.; Colgan, P.A.; McGarry, A.T. Radiological Protection Inst. of Ireland (Ireland). Oct 1994. 30p. Order Number DE95612435. Source: OSTI; NTIS (US Sales Only); INIS.

This report presents and interprets the results of surveys of domestic radon concentrations carried out by the Radiological Protection Institute of Ireland between 1989 and 1992. Data from low-density monitoring surveys in various counties are presented. The highest seasonally-corrected radon level found in any of the 1755 dwellings surveyed was 2399 Bq/m^3. This is twelve times the national Reference Level of 200 Bq/m^3, and corresponds to an annual radiation dose to occupants of the house of 60 mSv, three times the maximum dose which radiation workers are allowed to receive under internationally-accepted standards. Statistical evaluation of the data has allowed classification of 10 km grid square areas on the basis of the predicted proportion of houses in each grid square with radon levels in excess of the national Reference Level, 200 Bq/m^3. The most affected areas occur in counties Mayo and Galway, and to a lesser extent in south-east Cork city. In county Galway six grid squares are predicted to have more than 20% of houses with radon concentrations in excess of 200 Bq/m^3. In the most affected grid square 30% of houses are predicted to have radon concentrations in excess of this level. It is important that householders in these areas be strongly encouraged to have the radon levels in their houses measured in order to identify the individual houses in which remedial measures are required. The risk associated with longterm exposure to radon has been calculated using the latest risk factor recommended by the International Commission on Radiological Protection.

8466 (SAND–94-8238) **The evaluation of potential limonene scavengers.** Roth, R. (Chensyn Science Labs., Lenexa, KS (United States)); Ebert, D.; Shepodd, T.J. Sandia National Labs., Livermore, CA (United States). Jan 1995. 35p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. Order Number DE95006853. Source: OSTI; NTIS; GPO Dep.

This work is the study of different scavengers of limonene. Limonene is a citrus-based, low toxicity, hydrocarbon solvent for cleaning circuit boards and other parts. Though almost all limonene evaporates after cleaning procedures, trace residual limonene would be a concern if allowed to migrate freely through a sealed system. This work was charted to investigate materials that would effectively scavenge and permanently immobilize trace limonene. The requirements of a successful scavenger are the following: it must remove >90% of 30 mg/l limonene from a sealed volume with 3 months, at 20–25 C; it must not release any volatiles over prolonged aging; it must be packaged such that limonene vapors can access the scavenger, but not such that the scavenging medium can migrate; and it must operate in the presence of water, oxygen, pentane, toluene, and carbon dioxide gases. A number of adsorbents were evaluated. Additionally, a scheme for scavenging limonene by chemical reaction was investigated at Sandia. This attempt was not successful. The details of this investigation are found at the end of this report.

8467 (SLU-JBT-R–93) **Performance of additives in reducing ammonia emissions from cow slurry.** Andersson, Mats. Swedish University of Agricultural Sciences, Department of Agricultural Biosystems and Technology, Lund (Sweden). 1994. 47p. Order Number DE95737652. Source: OSTI; NTIS.

Ammonia emissions contribute substantially to environmental pollution and cause severe acidification. In Sweden, 20-25% of the total ammonia emission derives from manure in animal buildings. One technique to decrease ammonia emissions from animal buildings is to apply emission-reducing additives in the manure. However, the efficiencies of many of the manure additives on the market have not been determined, and those additives that have been evaluated are difficult to compare due to different test methods and methods of evaluation. The objectives of this study were to investigate the abilities of different manure additives in reducing ammonia emission, for how long they would be efficient, and to which cost the additives can be used. The results show that high reductions (up to 50%) in ammonia emissions are possible to obtain with some of the additives, at least during the first week after the application of the additives. The reductions decrease over time, and they are hardly noticeable after six weeks. The costs to which these additives can be used are high in relation to the amount of nitrogen they save. 33 refs, 3 figs, 13 tabs

8468 (SVF–521) **Stack gas flow measurement based on fan characteristics.** Yli-Juuti, E. (Indmeas Ky Industrial Measurements, Espoo (Finland)); Kuoppamaeki, R. Stiftelsen foer Vaermeteknisk Forskning, Stockholm (Sweden). Dec 1994. 35p. (In Swedish). Order Number DE95737674. Source: OSTI; NTIS.

The aim of the project was to evaluate the accuracy and the stability of the stack gas flow meters used to calculate stack gas emissions. Special attention was given to a new continuous flow measurement method, called the fan method. In this method stack gas flow is continuously calculated from the measured values for differential pressure over the stack gas fan and for its control quantity. The mathematical form of the calculation equation is derived from the fan physics. The values for the constant in the equation are determined from in situ calibration measurements. The project was carried out as case studies on three solid fuel boilers. The boilers were chosen so that their stack gas flow meters, a thermal mass flow meter, a permanently installed pitot tube, and an ultrasonic flow meter were representative of the types most commonly used in Sweden for stack gas flow measurement. The fan method was formulated into a generally applicable measurement method which can be applied to boilers with all kinds of stack gas systems. The observations on the fan method suggested that in order to keep the measurement uncertainty within ± 4% calibrations against a flow rate reference would be needed perhaps only every second year. The results from the first calibrations of the stack gas flow meters showed that after installation and maintenance controls by the site personnel, significant errors often exist in the measurements. These errors must be eliminated by in situ calibration using a reliable flow rate reference. Long term instability was also observed. It was concluded that the flow meters should be calibrated at least twice a year in order to have some confidence that the measurement inaccuracy is below ± 4%. 12 figs

5402 Environmental Sciences, Terrestrial

Refer also to citation(s) 7167, 7293, 7294, 7298, 7301, 7302, 7304, 7311, 7324, 7329, 7330, 7331, 7340, 7358, 7366, 7417, 7435, 7441, 7442, 7443, 7446, 7461, 7462, 7467, 7477, 7479, 7485, 7488, 7507, 7508, 7818, 7820, 7821, 7861, 7864, 8042, 8238, 8420, 8428, 8435, 8438, 8453, 8459, 8463, 8530, 8531, 8534, 8569, 8570, 8586, 8640, 8642, 8643, 8646, 8648, 8649, 8651

8469 (BHR–80) **Core scanning for Th, U and K. Problems and solutions.** Korsbech, U. Danmarks Tekniske Univ., Lyngby (Denmark). Afd. for Elektrofysik. Aug 1994. 66p. Order Number DE95612398. Source: OSTI; NTIS; INIS.

A core scanner with a 10cm x 10cm NaI(Tl) crystal and a 256 channel analyzer has been built and calibrated for spectral gamma-ray measurement of Th, U and K in cores from boreholes. The calibration has been performed for cores of different diameters and densities, and the influence of liners, incomplete cores, and a varying core to detector distances have been investigated. A single formula for determination of the sensitivities for the window method

has been developed. The stability against changes in temperature and radon background is evaluated. Proposals for an improved and faster measuring technique with two or more detectors is put forward. (au).

8470 (DOE/MC/28245–3922) **Soil treatment to remove uranium and related mixed radioactive heavy metal contaminants. Seventh quarterly technical progress report, July 1, 1994–September 30, 1994.** Buckley, L.P. Atomic Energy of Canada Ltd., Chalk River, ON (Canada). [1994]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FC21-92MC28245. Order Number DE95006153. Source: OSTI; NTIS; INIS; GPO Dep.

The objective of this project is to design and develop a physicochemical treatment process for the removal of uranium and heavy metals from contaminated soil to achieve target contamination levels below 35 pCi/g of soil and a target for non-radioactive heavy metals below concentration levels permissible for release of the soil. The work will involve bench-scale and pilot-scale tests, using chelation-flotation, chemical leaching and ultrasonic leaching techniques, in conjunction with cross-flow microfiltration and filter-press operations. The effectiveness of an integrated process to treat leachates generated from soil processing will be demonstrated. Process flow-sheets suitable for in-situ and ex-situ applications will be developed and preliminary costs will be provided for the soil and leachate treatment technologies. The Task 2 Topical Report (milestone No. 4) summarizing contaminant removal results obtained from bench-scale studies using Fernald uranium soils and Chalk River Laboratories Chemical Pit soils was completed and issued on August 8, 1994. The results have shown that the soils containing uranium (about 400 pCi/g of soil) and strontium-90 (about 1200 pCi/g of soil) can be decontaminated to the target level of 35 pCi/g of treated soil in the presence of an ultrasonic field. Preliminary results obtained from the in-situ soil leaching tests are the average strontium-90 concentration in the cell was about 250 pCi/g; and the use of a dilute mineral acid (0. 1 mol/L HCl) removed in excess of 85% of strontium-90 originally present in the soil.

8471 (DOE/NV/10384–28) **Classification of groundwater at the Nevada Test Site.** Chapman, J.B. Nevada Univ., Reno, NV (United States). Desert Research Inst. Aug 1994. 59p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC08-85NV10384 ; AC08-90NV10845. Order Number DE95006257. Source: OSTI; NTIS; GPO Dep.

Groundwater occurring at the Nevada Test Site (NTS) has been classified according to the "Guidelines for Ground-Water Classification Under the US Environmental Protection Agency (EPA) Ground-Water Protection Strategy" (June 1988). All of the groundwater units at the NTS are Class II, groundwater currently (IIA) or potentially (IIB) a source of drinking water. The Classification Review Area (CRA) for the NTS is defined as the standard two-mile distance from the facility boundary recommended by EPA. The possibility of expanding the CRA was evaluated, but the two-mile distance encompasses the area expected to be impacted by contaminant transport during a 10-year period (EPA,s suggested limit), should a release occur. The CRA is very large as a consequence of the large size of the NTS and the decision to classify the entire site, not individual areas of activity. Because most activities are located many miles hydraulically upgradient of the NTS boundary, the CRA generally provides much more than the usual two-mile buffer required by EPA. The CRA is considered sufficiently large to allow confident determination of the use and value of groundwater and identification of potentially affected users. The size and complex hydrogeology of the NTS are inconsistent with the EPA guideline assumption of a high degree of hydrologic interconnection throughout the review area. To more realistically depict the site hydrogeology, the CRA is subdivided into eight groundwater units. Two main aquifer systems are recognized: the lower carbonate aquifer system and the Cenozoic aquifer system (consisting of aquifers in Quaternary valley fill and Tertiary volcanics). These aquifer systems are further divided geographically based on the location of low permeability boundaries.

8472 (DOE/NV/10845–35) **The application of borehole logging to characterize the hydrogeology of the Faultless site, Central Nevada Test Area.** Chapman, J.B.; Mihevc, T.M.; Lyles, B.F. Nevada Univ., Las Vegas, NV (United States). Water Resources Center. Aug 1994. 39p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC08-90NV10845. Order Number DE95003833. Source: OSTI; NTIS; INIS; GPO Dep.

The Central Nevada Test Area was the site of the Faultless underground nuclear test that could be a source of radionuclide contamination to aquifers in Hot Creek Valley, Nevada. Field studies in 1992 and 1993 have used hydrologic logging and water sampling to determine the adequacy of the current groundwater monitoring network and the status of water-level recovery to pre-shot levels in the nuclear chimney. The field studies have determined that there is a possibility for contaminant migration away from the Faultless event though the pre-event water level has not been attained, while new data raise questions about the ability of the current monitoring network to detect migration. Hydrologic logs from the postshot hole (drilled into the chimney created by the nuclear detonation) reveal inflow around 485 m below land surface. The physical and chemical characteristics of the inflow water indicate that its source is much deeper in the chimney, perhaps driven upward in a convection cell generated by heat near the nuclear cavity. Logging and sampling at monitoring wells HTH-1 and HTH-2 revealed that the completion of HTH-1 may be responsible for its elevated water level (as compared to pre-nuclear test levels) and may have also created a local mound in the water table in the alluvium that accounts for higher post-test water levels at HTH-2. This mound would serve to divert flow around the monitoring wells, so that only migration of contaminants through the underlying, higher pressure, volcanic units is currently monitored. A hydraulic high found in an abandoned hole located between the nuclear chimney and the monitoring wells further reduces the likelihood of HTH-1 or HTH-2 intercepting contaminant migration.

8473 (DOE/NV/10845–50) **Potential hydrologic characterization wells in Amargosa Valley.** Lyles, B.; Mihevc, T. Nevada Univ., Reno, NV (United States). Water Resources Center. Sep 1994. 48p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC08-90NV10845. Order Number DE95005111. Source: OSTI; NTIS; INIS; GPO Dep.

More than 500 domestic, agricultural, and monitoring wells were identified in the Amargosa Valley. From this list, 80 wells were identified as potential hydrologic characterization wells, in support of the US Department of Energy (DOE) Underground Test Area/ Remedial Investigation and Feasibility Study (UGTA/RIFS). Previous hydrogeologic studies have shown that groundwater flow in the basin is complex and that aquifers may have little lateral continuity. Wells located more than 10 km or so from the Nevada Test Site (NTS) boundary may yield data that are difficult to correlate to sources from the NTS. Also, monitoring well locations should be chosen within the guidelines of a hydrologic conceptual model and monitoring plan. Since these do not exist at this time, recompletion recommendations will be restricted to wells relatively close (approximately 20 km) to the NTS boundary. Recompletion recommendations were made for two abandoned agricultural irrigation wells near the town of Amargosa Valley (previously Lathrop Wells), for two abandoned wildcat oil wells about 10 km southwest of Amargosa Valley, and for Test Well 5 (TW-5), about 10 km east of Amargosa Valley.

8474 (ENRESA–08/94) **Mobile units to hydro geochemistry characterization.** Gomez, P.; Martinez, B.; Turrero, M.J. Centro de Investigaciones Energeticas, Medioambientales y Tecnologicas (CIEMAT), Madrid (Spain). 1994. 58p. (In Spanish). Order Number DE95739356. Source: OSTI; NTIS; INIS.

This report shows the mobile units for hydro geochemical studies. The authors analyze the work of mobile unit and the cars that conform the unit: Sampling car and analysis car: The sampling and equipment are took into account as well.

8475 (ENRESA–10/94) **Study of isotopic desequilibrium of natural radioactive series in granitic environment: Pluton of El Berrocal (Toledo).** Hernandez Benitez, A. Centro de Investigaciones Energeticas, Medioambientales y Tecnologicas (CIEMAT), Madrid (Spain). 1994. 161p. (In Spanish). Order Number DE95739385. Source: OSTI; NTIS; INIS.

This report summarizes the work funded by European Communities with contract " The Berrocal project: characterization and validation of natural radionuclide migration processes under real

conditions in a fissured granitic environment". The author takes into account the following aspects in his study: isotope of natural radionuclides, sampling methods, analytic methodology and geological characteristics of the area.

8476 (ES/ER/TM–96/R1) **Toxicological benchmarks for screening potential contaminants of concern for effects on aquatic biota: 1994 Revision.** Suter, G.W. II (Oak Ridge National Lab., TN (United States)); Mabrey, J.B. Oak Ridge National Lab., TN (United States). Jul 1994. 106p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE95005996. Source: OSTI; NTIS; GPO Dep.

This report presents potential screening benchmarks for protection of aquatic life from contaminants in water. Because there is no guidance for screening benchmarks, a set of alternative benchmarks is presented herein. The alternative benchmarks are based on different conceptual approaches to estimating concentrations causing significant effects. For the upper screening benchmark, there are the acute National Ambient Water Quality Criteria (NAWQC) and the Secondary Acute Values (SAV). The SAV concentrations are values estimated with 80% confidence not to exceed the unknown acute NAWQC for those chemicals with no NAWQC. The alternative chronic benchmarks are the chronic NAWQC, the Secondary Chronic Value (SCV), the lowest chronic values for fish and daphnids from chronic toxicity tests, the estimated EC20 for a sensitive species, and the concentration estimated to cause a 20% reduction in the recruit abundance of largemouth bass. It is recommended that ambient chemical concentrations be compared to all of these benchmarks. If NAWQC are exceeded, the chemicals must be contaminants of concern because the NAWQC are applicable or relevant and appropriate requirements (ARARs). If NAWQC are not exceeded, but other benchmarks are, contaminants should be selected on the basis of the number of benchmarks exceeded and the conservatism of the particular benchmark values, as discussed in the text. To the extent that toxicity data are available, this report presents the alternative benchmarks for chemicals that have been detected on the Oak Ridge Reservation. It also presents the data used to calculate benchmarks and the sources of the data. It compares the benchmarks and discusses their relative conservatism and utility.

8477 (FAAR–23/1993, pp. 65-68) **Characterization of soot particles by in situ measurement with different aerosol analysis tools.** Burtscher, H. (ETH-Hoenggerberg, Zuerich (Switzerland). Lab. for Solid State Physics); Matter, D.; Steiner, D. Finnish Association for Aerosol Research, Espoo (Finland). 1993. (CONF-9306401–: 5. Finnish national aerosol symposium, Espoo (Finland), 1-3 Jun 1993). In *Report series in aerosol science*. 292p. Order Number DE95737628. Source: OSTI; NTIS.

Properties of aerosol particles emitted from combustion processes significantly depend on the fuel used and on the characteristics of the combustion as flame temperature, air/fuel ratio etc. Particle analysis therefore is not only important for environmental reasons but can also be used to monitor and optimize the combustion process either when designing a combustion system or during operation in closed loop control systems. first some results from the parallel application of commercial aerosol equipment, mainly Aethalometer and TEOM, will be discussed, which allow to determine emission factors for black carbon (BC) and the ratio of BC-mass concentration to total mass concentration. In a second section features of a newly developed multi-wavelength aerosol photoemission sensor will be discussed, which allows to distinguish between particles from different sources.

8478 (IAEA-TECDOC–721, pp. 7-22) **Development of hydrogeological isotopic techniques in Sahelian countries. General framework and realization of regional project RAF/8/012 (Senegal, Mali, Niger, Cameroon).** Aranyossy, J.F. (Dakar (Senegal)); Gonfiantini, R.; Louvat, D.; Maksoudi, M. International Atomic Energy Agency, Vienna (Austria). Oct 1993. (In French). In *Water resources in the Sahel. Hydrogeological and hydrological studies in West Africa by isotopic techniques. Statement of accounts of studies carried out in the framework of the project RAF/8/012: Isotopic hydrology in Sahelian countries.* 211p. Order Number DE95615467. Source: OSTI; NTIS (US Sales Only); INIS.

Periods of drought strongly affecting the Sahel region during the previous two decades have outlined the precariousness of surface water reserves as well as the need to tap underground water. Extensive programs of ground water exploitation have been initiated throughout the region. Within a few years thousands of boreholes have been put in place. However, prematurely exploited underground layers often demonstrated their qualitative and quantitative vulnerability, thereby showing the need to embark on global studies of water resources, in order to come to as complete an understanding of aquifers as possible. Therefore, the IAEA started its first hydrological activities in Mali, Niger and Senegal within the scope of its Technical Cooperation programs. Isotope studies have revealed communications between layers, the connection between surface and ground water, the occurrence (or absence) of replenishing. The IAEA also put into place the first infrastructures for the application of tracer techniques and the use of nuclear instrumentation, as well as hydro-sedimentology. This document describes the objectives of the Regional African project on "the development of isotopic and nuclear techniques in hydrology in the Sahel countries", as well as the methodology and results (on transport of water and their solubles within the unsaturated soil; the relation between the surface waters and the aquifers; on the origin of piezometric depressions; on "very ancient" aquifers reported on more elaborately in the Ph.D. thesis of Mr. A. Faye of the University of Dakar; hydrological overview; isotopic characterization of water layers and origin of precipitation; isotopic composition of organic materials; study of nitrate pollutants; tracer techniques applied to study the balance of water flow; transport of suspended particles and sediment formation). The document ends with information on training, dissemination and exchange of (Abstract Truncated).

8479 (IAEA-TECDOC–721, pp. 39-51) **Estimation of effective recharge of aquifers under semi-arid conditions: Example in North Senegal.** Tandia, A.A. (C.A. Diop Univ., Dakar (Senegal). Dept. de Geologie); Gaye, C.B.; Aranyossy, J.F. International Atomic Energy Agency, Vienna (Austria). Oct 1993. (In French). In *Water resources in the Sahel. Hydrogeological and hydrological studies in West Africa by isotopic techniques. Statement of accounts of studies carried out in the framework of the project RAF/8/012: Isotopic hydrology in Sahelian countries.* 211p. Order Number DE95615467. Source: OSTI; NTIS (US Sales Only); INIS.

Application of various "classical methods' for the estimation of effective infiltration rate to the phreatic aquifer in North Senegal, results in a large range of values (from 0 to 95mm.an^{-1}). Chlorine balance method gives, on the basis of 11 profiles, a smaller range of values between 6.7 and 80.5 mm.y^{-1}. In this situation, the location of the bomb tritium signal in deep unsaturated soil zone, appears to be the most effective method for evaluating recharge. Tritium peaks, found in two profiles at respectively 12 and 20 m depth in the sand dunes formation near Louga, has provided an infiltration rate estimate of 22 to 26 mm.y^{-1}. (author). 21 refs, 6 figs, 5 tabs.

8480 (IAEA-TECDOC–721, pp. 53-63) **Importance of evaporation processes in the formation of the piezometric depression in Sahelian region: Hypothesis and modelling.** Ndiaye, B. (C.A. Diop Univ., Dakar (Senegal). Dept. de Geologie); Aranyossy, J.F.; Faye, A. International Atomic Energy Agency, Vienna (Austria). Oct 1993. (In French). In *Water resources in the Sahel. Hydrogeological and hydrological studies in West Africa by isotopic techniques. Statement of accounts of studies carried out in the framework of the project RAF/8/012: Isotopic hydrology in Sahelian countries.* 211p. Order Number DE95615467. Source: OSTI; NTIS (US Sales Only); INIS.

Results of the environmental isotopic studies carried out in Sahelian countries (Mali, Senegal, Niger, North-Cameroon) seem to attribute major importance to evaporation and transpiration processes in the formation of the regional piezometric depressions. The conceptual model developed on the basis of this theory considers a large time scale evolution corresponding to the global climatic change from the last holocene pluvial period to now. The vertical water deficit is considered, in each point, as exponentially decreasing with the water table depth. An analytical model is first presented to check this hypothesis and to analyze the importance of the different parameters involved in the formulation. A transient

numerical model is then described to depict, in one dimension, the evolution of an unconfined aquifer between two constant head boundaries. Simulation of a 8000 years evolution generates a figure in conformity with the piezometric profile observed in the field. (author). 14 refs, 7 figs.

8481 (IAEA-TECDOC–721, pp. 65-75) **Contribution to the chemical and environmental isotopic study of the dallol Bosso acquifers (Niger).** Galadima, S.A. (Direction Departementale de l'Hydraulique, Tillabery (Niger)); Karbo, A. International Atomic Energy Agency, Vienna (Austria). Oct 1993. (In French). In *Water resources in the Sahel. Hydrogeological and hydrological studies in West Africa by isotopic techniques. Statement of accounts of studies carried out in the framework of the project RAF/8/012: Isotopic hydrology in Sahelian countries.* 211p. Order Number DE95615467. Source: OSTI; NTIS (US Sales Only); INIS.

A chemical and stable isotopes study (0-18, H-2) has been carried out on the aquifers located in the 'dallol Bosso' region at about 100km eastward of the capital Niamey. Preliminary results demonstrate: (1) that the alluvial aquifer is mainly recharged by direct infiltration of runoff and rainwater but also shown, in some places a mixture with oldest water coming from the upward drainage of the underlying "Continental Terminal" aquifer; (2) the "direct recharge" is efficient and quick but directly dependant on the precipitation variability while the "deep recharge" (the value of which has not been yet quantified) is certainly more constant. Chemical and isotopic results also suggest that quite important water losses are taking place through evaporation processes. (author). 11 refs, 9 figs.

8482 (IAEA-TECDOC–721, pp. 77-93) **Impact of environmental isotopes in the fissured aquifer study in Mali.** Sidoro, M. (Direction Nationale de l'Hydraulique et de l'Energie, Bamako (Mali)); Guerre, A.; Aranyossy, J.F. International Atomic Energy Agency, Vienna (Austria). Oct 1993. (In French). In *Water resources in the Sahel. Hydrogeological and hydrological studies in West Africa by isotopic techniques. Statement of accounts of studies carried out in the framework of the project RAF/8/012: Isotopic hydrology in Sahelian countries.* 211p. Order Number DE95615467. Source: OSTI; NTIS (US Sales Only); INIS.

Interpretation of environmental isotopes in fissured au Mali has led to an improvement of the general knowledge obtained through classical hydrogeology and piezometric measurements. Tritium concentrations has proved the occurrence of important renewable water resources in the western and southern fissured aquifers of the country, even in the Sahelian zone. For this aquifer's type however, the recharge rate mainly depends on the lithology, the granulometry and the thickness of the superficial layers. Stable isotope contents and C-14 activities have confirmed the general present origin of most of the water bodies. However, some fossil water, recharged during the last humid Holocene period, has been demonstrated in precambrian sedimentary formations. The spatial distribution of isotope contents does not show any regional trends. It demonstrates the main importance of local circulation and evaporation in the natural water balance. (author). 16 refs, 8 figs, 5 tabs.

8483 (IAEA-TECDOC–721, pp. 95-105) **Environmental isotopic study of the Korama aquifers, south of Zinder (Niger).** Zakara, Z. (Direction Departementale de l'Hydraulique, Maradi (Niger)); Karbo, A.; Aranyossy, J.F. International Atomic Energy Agency, Vienna (Austria). Oct 1993. (In French). In *Water resources in the Sahel. Hydrogeological and hydrological studies in West Africa by isotopic techniques. Statement of accounts of studies carried out in the framework of the project RAF/8/012: Isotopic hydrology in Sahelian countries.* 211p. Order Number DE95615467. Source: OSTI; NTIS (US Sales Only); INIS.

A first environmental isotope study has been carried out on the "Korama" aquifers located in the southern part of the city of Zinder (Niger). Preliminary interpretation confirms that most of the aquifers are presently recharged by direct infiltration of rainwater. Structural fractures seem to play an important role in the water circulation allowing vertical drainage of oldest water coming from deeper aquifers and facilitating the recharge by surface water in the prheatic zone. It does not appear any difference between the so-called "superficial Korama" and the "Deep Korama" aquifers on the basis of the isotopic compositions. (author). 11 refs, 7 figs, 2 tabs.

8484 (IAEA-TECDOC–721, pp. 107-122) **Environmental isotopic study of the "Grand Yaere" aquifers (North-Cameroon).** Ketchemen, B. (C.A. Diop Univ., Dakar (Senegal). Dept. de Geologie); Faye, A.; Naah, E.; Aranyossy, J.F. International Atomic Energy Agency, Vienna (Austria). Oct 1993. (In French). In *Water resources in the Sahel. Hydrogeological and hydrological studies in West Africa by isotopic techniques. Statement of accounts of studies carried out in the framework of the project RAF/8/012: Isotopic hydrology in Sahelian countries.* 211p. Order Number DE95615467. Source: OSTI; NTIS (US Sales Only); INIS.

The Grand Yaere ("alluvial plain" and "Yaere plain ss") belongs to the "Great Chadian sedimentary basin". Aquifers are hosted in the last-Tertiary formations and Quaternary deposits linked to the Chad lake fluctuations. Interpretation of environmental isotope data on precipitation, surface water and groundwater has led to an understanding of the general hydrogeologic scheme. The main aquifer recharge zone is localized in the alluvial plain at the piedmont of the Mandara mountains. Surface water spread on the plain by seasonal floods are totally lost by evapotranspiration. Furthermore, it appears that the "generalized Yaere aquifer" should be divided in an upper part - with recent water - and a deeper part holding fossil water. Consequently, the depth of the piezometric depressions is certainly lower than it was before considered. (author). 19 refs, 9 figs, 4 tabs.

8485 (IAEA-TECDOC–721, pp. 123-132) **Contribution of environmental isotopes in the hydrogeological study of the Casamance's aquifers (South of Senegal).** Faye, A. (C.A. Diop Univ., Dakar (Senegal). Dept. de Geologie); Tandia, A.A.; Travi, Y.; Le Priol, J.; Fontes, J.C. International Atomic Energy Agency, Vienna (Austria). Oct 1993. (In French). In *Water resources in the Sahel. Hydrogeological and hydrological studies in West Africa by isotopic techniques. Statement of accounts of studies carried out in the framework of the project RAF/8/012: Isotopic hydrology in Sahelian countries.* 211p. Order Number DE95615467. Source: OSTI; NTIS (US Sales Only); INIS.

Environmental isotopes study (^{18}O, ^{2}H, ^{14}C, ^{13}C) on the aquifers of the Casamance region has provided new information in addition to "classical" hydrogeological investigations. (1) The "Continental Terminal" aquifer, in the Sedhiou-Marsassoum basin, is characterized by recent non evaporated water. Its recharged correspond to the direct infiltration of present precipitation. (2) The Oligo-Miocene aquifer recharge proceeds from two different origins: a direct recharge from precipitation and a vertical upward drainage from the Maastrischian formations. (3) the C-14 activities in the Maastrischian aquifer confirm that a present recharge still occurs on the Eastern edge of the basin where the formation outcrops in contact on the crystalline basement. In the western part of the Oligo-Miocene and Maastrischian aquifers, ^{14}C activities become extremely low and groundwater datation needs long-live radiochronometers. (author). 5 refs, 7 figs, 7 tabs.

8486 (IAEA-TECDOC–721, pp. 133-145) **Natural groundwater recharge in the Garoua basin (North-Cameroon): Hydrochemical and isotopic approaches.** Njitchoua, R. (Laboratoire d'Hydrologie et de Geochimie Isotopique, Orsay (France)); Fontes, J.C.; Dever, L.; Naah, E.; Aranyossy, J.F. International Atomic Energy Agency, Vienna (Austria). Oct 1993. (In French). In *Water resources in the Sahel. Hydrogeological and hydrological studies in West Africa by isotopic techniques. Statement of accounts of studies carried out in the framework of the project RAF/8/012: Isotopic hydrology in Sahelian countries.* 211p. Order Number DE95615467. Source: OSTI; NTIS (US Sales Only); INIS.

The stable isotopic content of daily precipitation sampled at Garoua (North Cameroon) shows large variations principally due to the climatic conditions during rain events and to the type of air masses which generated the precipitation. The isotopic values of groundwater suggest, throughout the basin, a rapid and easy recharge of the aquifers by direct infiltration of precipitation. In some places, isotopic enrichment content could be attributed to evaporation processes during precipitation. Groundwater is generally of calcium and sodium bicarbonate type, deriving from the hydrolysis of the sandstone silicate minerals. They are chemically good for drinking water, but localised high concentrations in nitrates indicate a real risk of pollution of the aquifer. Carbon-13

values of the TDIC indicate that the geochemical system is open with respect to the soil-CO_2. Carbon-14 activities, corresponding to modern water, show that the aquifer is currently actively recharged. In some parts however, old waters have been evidenced, corresponding to recharge occurred under more humid conditions than those presently prevailing. (author). 29 refs, 8 figs, 3 tab.

8487 (IAEA-TECDOC–721, pp. 169-179) **In situ measurements of suspended sediment transport in the wadi dourou ("pays Dogon" - Mali).** Sissoko, M.F. (Direction Nationale de l'Hydraulique et de l'Energie, Bamako (Mali). Section Amenagement des Bassins Fluviaux); Diarra, S.; Fofana, A.; Alpha, A. International Atomic Energy Agency, Vienna (Austria). Oct 1993. (In French). In *Water resources in the Sahel. Hydrogeological and hydrological studies in West Africa by isotopic techniques. Statement of accounts of studies carried out in the framework of the project RAF/8/012: Isotopic hydrology in Sahelian countries.* 211p. Order Number DE95615467. Source: OSTI; NTIS (US Sales Only); INIS.

A nuclear gauge has been installed in the riverbed of little wadi in the "pays Dogon" in order to measure the sediment transport during the floods. The region, formed by outcrops of precambrien sandstones and little valleys filled by sandy alluvial deposit, undergoes intense erosion due to violent storms during the rainy season. The phenomenon is furthermore aggravated by deforestation processes which reduce natural infiltration of water and increase surface run-off. Like all water courses on the plateau, the "Dourou" wadi is ephemeral and runs only during the rainy season with very short and violent floods after rain events. The principle of the sediment transport measurements is based on the absorption of gamma rays between a nuclear source (Am-241) and a detector, both installed in the wadi-bed. As the gauge response depends on the geometry of the system (mainly distance source - detector) and on the mineralogic nature of the suspended sediments, a proper calibration curve should be determined before application in the field. Measurements made during the rainy season 1990 and 1991 has shown a sediment transport of some tens to several hundred tons depending on the force of the storms. The total amount during one rainy season has been estimated to about 5,000 tons which would given an average erosion rate of about 10tonnes/km^2/year on the basin. The main advantages of the method consist, especially in remote regions of difficult access, in the possibilities of automatic and continuous measurements. The equipment installed in Mali has provided fundamental information on erosion processes on the "plateau Dogon". In this particular case, however, the geometry of the system would have to be modified in order to enable measurements of the sediment transport at the very beginning of the floods. (author). 10 refs, 7 figs, 1 tab.

8488 (IAEA-TECDOC–721, pp. 187-199) **Volcanic CO_2 contribution in the geochemical and isotopic equilibrium of the TIDC in the Irhazer aquifers (Niger).** Joseph, A. (Niamey Univ., Niamey (Nigeria). Dept. de Geologie). International Atomic Energy Agency, Vienna (Austria). Oct 1993. (In French). In *Water resources in the Sahel. Hydrogeological and hydrological studies in West Africa by isotopic techniques. Statement of accounts of studies carried out in the framework of the project RAF/8/012: Isotopic hydrology in Sahelian countries.* 211p. Order Number DE95615467. Source: OSTI; NTIS (US Sales Only); INIS.

Geochemical and isotopic characteristics of total inorganic dissolved carbone (TIDC) of groundwater bodies in the Irhazer sedimentary basin, do not follow the natural evolution of the balance linked to confinement process. On the other side of a main tectonic accident, we demonstrate an important increase of the alkalinity and of the CO_2 partial pressure, added to an enrichment in carbon-13 content. Among different hypothesis, we take into account a volcanic production of CO_2, $\delta^{13}C_{co2}$ of which is closed to -7 deg./00 PDB. This gas feeds the system through the active "In Azaoua" fracture system. (author). 24 refs, 6 figs, 1 tab.

8489 (IC–94/238) **An approximate inversion method of geoelectrical sounding data using linear and bayesian statistical approaches. Examples of Tritrivakely volcanic lake and Mahitsy area (central part of Madagascar).** Ranaivo Nomenjanahary, F. (Institute of Geophysical Observatory, Antananarivo (Madagascar)); Rakoto, H.; Ratsimbazafy, J.B. International Centre for Theoretical Physics, Trieste (Italy). Aug 1994. 16p. Order Number DE95612415. Source: OSTI; NTIS (US Sales Only); INIS.

This paper is concerned with resistivity sounding measurements performed from single site (vertical sounding) or from several sites (profiles) within a bounded area. The objective is to present an accurate information about the study area and to estimate the likelihood of the produced quantitative models. The achievement of this objective obviously requires quite relevant data and processing methods. It also requires interpretation methods which should take into account the probable effect of an heterogeneous structure. In front of such difficulties, the interpretation of resistivity sounding data inevitably involves the use of inversion methods. We suggest starting the interpretation in simple situation (1-D approximation), and using the rough but correct model obtained as an a-priori model for any more refined interpretation. Related to this point of view, special attention should be paid for the inverse problem applied to the resistivity sounding data. This inverse problem is nonlinear, while linearity inherent in the functional response used to describe the physical experiment. Two different approaches are used to build an approximate but higher dimensional inversion of geoelectrical data: the linear approach and the bayesian statistical approach. Some illustrations of their application in resistivity sounding data acquired at Tritrivakely volcanic lake (single site) and at Mahitsy area (several sites) will be given. (author). 28 refs, 7 figs.

8490 (IC–94/283) **ESAA environment for seismic activity analysis.** Zhang Shuyu; Hao Bailin. International Centre for Theoretical Physics, Trieste (Italy). Sep 1994. 9p. Order Number DE95612416. Source: OSTI; NTIS (US Sales Only); INIS.

ESAA is an X-window based, graphical and interactive, software system for analyzing seismic activity, using the earthquake catalogues of a given region as input. Basic design idea and structure of this system, as well as the progress in its implementation are reported. (author). 12 refs.

8491 (INIS-mf–14415) **Study of radon-222 emanation from sedimentary phosphates and corresponding phosphogypsum. Temperature effect.** Boujrhal, F.M. Universite Mohammed 5, Rabat (Morocco). Faculte des Sciences. 16 Jul 1993. 186p. (In French). Order Number DE95612386. Source: OSTI; NTIS (US Sales Only); INIS.

The aim of this study is to examine the effect of temperature on radon emanation from the phosphates of various regions of Morocco, from corresponding phosphogypsum and from teeth fossilized of Youssoufia phosphate. The interpretation of obtained results was carried out by the physicochemical studies with various approaches; the X-ray diffraction analysis, the measurement of the specific surface area and porousness, the determination of the oxygen content by activation analysis with 14 MeV neutron. The thermal treatment between 100 and 900 degrees C conducted to the following points: - An increase of the radon degassing rate, which is first slow when the temperature increase from 20 to 600 degrees C, then becomes brutal beyond this temperature. We attributed this variation to the training effect (transport effect) of radon by the others gas susceptible to be released with thermal effect, particularly the CO sub 2. - The reduction of the radon emanation power versus temperature. We could demonstrate a linear correlation between the power emanation and the specific surface area. 122 refs., 102 figs., 20 tabs. (Author).

8492 (INIS-mf–14436, pp. O3.1-O3.11) **International comparison of environmental protection provisions in remedial actions on uranium mine and mill tailings.** Dahlkamp, F.J. No corporate text available. Oct 1993. 157p. (In German). (CONF-9310403–: The mining Pribram in science and technology, Pribram (Czech Republic), 13-16 Oct 1993). In *The mining Pribram in science and technology. Section O: Mining and the environment.* Order Number DE95612417. Source: OSTI; NTIS (US Sales Only); INIS.

For the five major western countries involved in uranium mining and milling (the USA, Canada, Australia, South Africa and France) as well as for Germany, the philosophy is summarized of remedial actions on environmental damage caused by uranium minimg and milling. The related legislation adopted so far in these countries and the responsible authorities are listed. The actual remedial technologies, their management and licensing procedures used in the

countries are described. The situation in the Czech Republic is then briefly characterized. In conclusion recommendations are given for former COMECON countries in general and the Czech Republic in particular, listing a number of individual steps to be taken, including e.g. the removal of leaching solutions from leached ore-bearing strata, compilation of a data base of remedial action concepts and remedial technologies, and the performing of cost-benefit analyses of remedial plans. (A.K.).

8493 (INIS-mf–14436, pp. O4.1-O4.3) **The Institute's view of the use of wastes for environmental remedial actions and land reclamation.** Sirotkova, D. No corporate text available. Oct 1993. 157p. (In Czech). (CONF-9310403–: The mining Pribram in science and technology, Pribram (Czech Republic), 13-16 Oct 1993). In *The mining Pribram in science and technology. Section O: Mining and the environment.* Order Number DE95612417. Source: OSTI; NTIS (US Sales Only); INIS.

The problems of land reclamation in regions affected by uranium ore mining and milling are discussed from the point of view of its effects on man. The health hazards of individual wastes are assessed based on applicable hygienic regulations. Waste is regarded as hazardous if it possesses at least one of the following properties: acute toxicity, serious irreversible delayed effect, serious local caustic effect, potential for the spread of a serious infection. Sludges from wastewater treatment plants are considered to be suitable for land reclamation. (J.B.). 4 refs.

8494 (INIS-mf–14436, pp. O5.1-O5.4) **Results of actions to reduce the amount of radon in the town of Jachymov. The nursery school building.** Domas, J. (Ministerstvo Zivotniho Prostredi, Prague (Czech Republic)); Posmourny, K. No corporate text available. Oct 1993. 157p. (In Czech). (CONF-9310403–: The mining Pribram in science and technology, Pribram (Czech Republic), 13-16 Oct 1993). In *The mining Pribram in science and technology. Section O: Mining and the environment.* Order Number DE95612417. Source: OSTI; NTIS (US Sales Only); INIS.

Radon measurements in some buildings in the town of Jachymov indicated that the limiting volume activities were exceeded substantially. Remedial actions were made in the nursery school building. These included gravitational ventilation of the cellar, fitting of all doors and passages between the cellar and school rooms with packing, installation of overpressure ventilation with heat recuperation, and sealing of all window gaps. (J.B.). 2 refs.

8495 (INIS-RU–378) **Complex probabilistic estimation of seismic resistance of nuclear power plants.** Butorin, S.L. Vsesoyuznyj Nauchno-Issledovatel'skij i Proektnyj Inst. Ehnergotekhniki (VNIPIEhT), Moscow (Russian Federation). 1991. 15p. (In Russian). Order Number DE95615485. Source: OSTI; NTIS (US Sales Only); INIS.

The paper describes an approach to quantitative probabilistic assessment of seismic resistance of nuclear power plants. General scheme of NPP seismic reliability assessment is described. A technique is proposed for assessing reliability of plants basic components (ground formations, building structures, process equipment) within the framework of two traditional approaches to the problem of installation seismic resistance: dynamic and linearly-spectral. A quantitative assessment of RBMK-100 plant reliability is presented as an example of probabilistic assessment of nuclear safety function.

8496 (Juel–2925) **Measuring program of the Federal Republic of Germany. Results of environmental measurement in Russia, Byelorussia and Ukraine in the time from May 17 to September 2, 1993, and from October 8 to November 1, 1993.** Heinemann, K.; Hille, R. Forschungszentrum Juelich GmbH (Germany). Abt. Sicherheit und Strahlenschutz. Jun 1994. 139p. (In German). Order Number DE95738044. Source: OSTI; NTIS (US Sales Only); INIS.

This report gives an overview on the results of the environmental measurements 1993, which have been gained in the frame of the measuring program of the Federal Republic of Germany in Russia, Byelorussia and Ukraine. In the time from May 17, to the end of October 18 scientists and engineers conducted environmental measurements and determined the contamination of soil and foodstuff. Samples of food of the population were measured and the results were given in a certificate with short explanation in Russian language. In 3 appendices of this report all results are given in detail. They are discussed in the way of local mean values. In regard to the preceding year the external dose and the soil contaminations are nearly constant. However the milk contaminations decreased with the exception of a few villages. Possible explanations for these exceptions are discussed. (orig.)

8497 (LA–12753-MS) **High explosive spot test analyses of samples from Operable Unit (OU) 1111.** McRae, D.; Haywood, W.; Powell, J.; Harris, B. Los Alamos National Lab., NM (United States). Jan 1995. 23p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. Order Number DE95005742. Source: OSTI; NTIS; GPO Dep.

A preliminary evaluation has been completed of environmental contaminants at selected sites within the Group DX-10 (formally Group M-7) area. Soil samples taken from specific locations at this detonator facility were analyzed for harmful metals and screened for explosives. A sanitary outflow, a burn pit, a pentaerythritol tetranitrate (PETN) production outflow field, an active firing chamber, an inactive firing chamber, and a leach field were sampled. Energy dispersive x-ray fluorescence (EDXRF) was used to obtain semi-quantitative concentrations of metals in the soil. Two field spot-test kits for explosives were used to assess the presence of energetic materials in the soil and in items found at the areas tested. PETN is the major explosive in detonators manufactured and destroyed at Los Alamos. No measurable amounts of PETN or other explosives were detected in the soil, but items taken from the burn area and a high-energy explosive (HE)/chemical sump were contaminated. The concentrations of lead, mercury, and uranium are given.

8498 (LA-UR–94-3685) **A brief review of environmental transport of tritium at the Los Alamos LLRW disposal facility.** Vold, E.L. Los Alamos National Lab., NM (United States). [1994]. 15p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-941214–1: 16. US Department of Energy low-level radioactive waste management conference, Phoenix, AZ (United States), 13-15 Dec 1994). Order Number DE95002699. Source: OSTI; NTIS; INIS; GPO Dep.

A large data base of tritium in the environmental the Los Alamos National Laboratory LLRW disposal facility, Area G, is summarized. Tritium in surface and subsurface soil moisture indicates three disposal areas significantly elevated above background with the highest results around the currently used tritium disposal shafts. Airborne concentrations are well below appropriate concentration guidelines but vary seasonally by over an. order of magnitude. Surface efflux measurements show seasonal and diurnal time dependent variations with a positive correlation with ambient temperature. The integral of the surface efflux is estimated as a release on the order of ten Curies/year. A subsurface tritium plume observed in the early seventies has since been greatly reduced indicating an effective half-life in the environment which is significantly shorter than the radiologic half-life. Subsurface migration from the mesa top disposal facility has resulted in tritium in the canyon water immediately adjacent to the disposal site which is marginally elevated above background. The hydrogeologic diffusion near the tritium shafts is compared to model results to predict the vertical extent of the tritium migration. Field work to define this limit and additional quantification of tritium sources and migration is continuing.

8499 (LBL–36211) **Development of hydrogeological modelling approaches for assessment of consequences of hazardous accidents at nuclear power plants.** Rumynin, V.G. (St. Petersburg Mining Inst. (Russian Federation)); Mironenko, V.A.; Konosavsky, P.K.; Pereverzeva, S.A. Lawrence Berkeley Lab., CA (United States). Jul 1994. 44p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00098. Order Number DE95006719. Source: OSTI; NTIS; INIS; GPO Dep.

This paper introduces some modeling approaches for predicting the influence of hazardous accidents at nuclear reactors on groundwater quality. Possible pathways for radioactive releases from nuclear power plants were considered to conceptualize boundary conditions for solving the subsurface radionuclides transport problems. Some approaches to incorporate physical-and-chemical interactions into transport simulators have been

developed. The hydrogeological forecasts were based on numerical and semi-analytical scale-dependent models. They have been applied to assess the possible impact of the nuclear power plants designed in Russia on groundwater reservoirs.

8500 (NEI-DK–1754) **Winter meeting on ground water pollution.** Akademiet for de Tekniske Videnskaber, Lyngby (Denmark). 1993. 242p. (In Danish). (CONF-9303327–: Winter meeting on ground water pollution, Bredsten (Denmark), 2-3 Mar 1993). Order Number DE95737555. Source: OSTI; NTIS.

Papers presented at a meeting on ground water pollution held on March 2-3, 1993 at Vingstedcentret, Bredsten in Denmark. (AB)

8501 (NEI-DK–1754, pp. 31-41) **Organic micro-pollutions in ground water resources, cleaning and water usage.** Arvin, E. (Laboratoriet for tekniske Hygiejne, Danmarks Tekniske Hoejskole (Denmark)). Akademiet for de Tekniske Videnskaber, Lyngby (Denmark). 1993. (In Danish). (CONF-9303327–: Winter meeting on ground water pollution, Bredsten (Denmark), 2-3 Mar 1993). In *Winter meeting on ground water pollution.* 242p. Order Number DE95737555. Source: OSTI; NTIS.

A short survey is given of sources of organic pollutive substances and of what has actually been found in Danish groundwater. Possibilities for cleaning the water and the criteria for the use of water and the criteria for the use of water containing micro-pollutants, are discussed. Micro-pollution is the term used for a concentration of substances of 1 μg/l. It is generally concluded that Danish groundwater resources are polluted with organic substances and chemicals only to a limited degree as a result of human activities. (AB) (14 refs.)

8502 (NEI-DK–1754, pp. 43-58) **New method for cleaning ground water which contains chromate.** Christensen, T. (I. Krueger A/S (Denmark)); Aktor, H. Akademiet for de Tekniske Videnskaber, Lyngby (Denmark). 1993. (In Danish). (CONF-9303327–: Winter meeting on ground water pollution, Bredsten (Denmark), 2-3 Mar 1993). In *Winter meeting on ground water pollution.* 242p. Order Number DE95737555. Source: OSTI; NTIS.

A pilot system for cleaning ground water that has been polluted with chromates and sulphates leached from deposited fly ash is described. The cleaning method was found to be satisfactory for removing chromates, the use of iron was minimal and the process was simple. (AB) (13 refs.)

8503 (NEI-DK–1754, pp. 157-170) **What is the actual diffusion of pollutants through the earth surface/cellar floor? Can flux-chamber measurements give an answer?.** Wille, E. (Dansk Teknologisk Institut. Miljoeteknik (Denmark)). Akademiet for de Tekniske Videnskaber, Lyngby (Denmark). 1993. (In Danish). (CONF-9303327–: Winter meeting on ground water pollution, Bredsten (Denmark), 2-3 Mar 1993). In *Winter meeting on ground water pollution.* 242p. Order Number DE95737555. Source: OSTI; NTIS.

A method of measurement of the diffusion of hydrocarbons into buildings from polluted soil is described, especially with regard to the use of a flux chamber a half-sphere placed directly on the surface through which the flux should be measured. (au)

8504 (NEI-DK–1754, pp. 171-185) **Diffusion of volatile organic components through concrete floors.** Kirkegaard, C. (Geoteknisk Institut, ATV (Denmark)); Holm, J. Akademiet for de Tekniske Videnskaber, Lyngby (Denmark). 1993. (In Danish). (CONF-9303327–: Winter meeting on ground water pollution, Bredsten (Denmark), 2-3 Mar 1993). In *Winter meeting on ground water pollution.* 242p. Order Number DE95737555. Source: OSTI; NTIS.

Two types of concrete commonly used in floor constructions were tested and evaluated for their ability to hinder diffusion of volatile organic components from polluted soil into buildings. Results are given in detail. (AB)

8505 (NEI-DK–1755) **Research projects on ground water pollution.** Akademiet for de Tekniske Videnskaber, Lyngby (Denmark). 1993. 186p. (In Danish, English). (CONF-9311278–: ATV meeting on research projects on ground water pollution, Lyngby (Denmark), 17 Nov 1993). Order Number DE95737554. Source: OSTI; NTIS.

Papers presented to a committee working with ground water pollution at The Technical University of Denmark at a meeting held on November 17th, 1993. (AB)

8506 (NEI-DK–1755, pp. 139-153) **Experimental investigation of the migration of the miscible and immiscible components following a light oil spill.** Butts, M.B. (Instituttet for Stroemningsmekanik og Vandbygning, ISVA, DTH (Denmark)); Hoegh Jensen, K. Akademiet for de Tekniske Videnskaber, Lyngby (Denmark). 1993. (CONF-9311278–: ATV meeting on research projects on ground water pollution, Lyngby (Denmark), 17 Nov 1993). In *Research projects on ground water pollution.* 186p. Order Number DE95737554. Source: OSTI; NTIS.

The dissolution of the water-soluble components from an oil plume into groundwater represents the most direct threat to groundwater quality following a subsurface oil spill. This process is dependent, amongst other factors, on the migration of the bulk oil within the subsurface. An experimental study of the subsurface migration of both the miscible and immiscible components following a light oil spill in an unconfined aquifer is presented. Using two-dimensional groundwater flumes, two controlled spills of a light oil above a sloping groundwater table were performed. During the first spill the movement of the immiscible bulk oil in the unsaturated and saturated zones was monitored using time-lapse video, as well as a dual gamma attenuation device. For the second spill water samplers were installed downstream of the spill and a single water-soluble component added to the injected oil. Observations of the miscible contaminant plume were obtained by gas chromatography analysis of water samples downstream of the plume. It was found that the transfer of the water-soluble components is controlled by the multiphase flow of the bulk oil within the saturated and unsaturated zone. The front of the developing miscible flume appears confined to the capillary fringe. Dye tracing of the groundwater flow shows this is consistent with the flow of water around the oil plume. Such long narrow plumes may reduce the effectiveness of conventional contaminant recovery schemes and complicate plume delineation. (AB)

8507 (NEI-DK–1755, pp. 157-161) **Contaminant transport at a waste incinerator residue deposit. 2D hydrogeochemical modelling.** Traberg, R. (Institute og Hydrodynamics and Hydraulic Engineering/Groundwater Research Centre, Technical University of Denmark (Denmark)); Engesgaard, P. Akademiet for de Tekniske Videnskaber, Lyngby (Denmark). 1993. (CONF-9311278–: ATV meeting on research projects on ground water pollution, Lyngby (Denmark), 17 Nov 1993). In *Research projects on ground water pollution.* 186p. Order Number DE95737554. Source: OSTI; NTIS.

A 2D hydrogeochemical model based on the USGS programs MOC and PHREEQE has been developed and applied to an accidental aquifer contamination, where ion exchange was the controlling geochemical reaction. MOC has the advantage of introducing little numerical dispersion, which is here shown to be essential for hydrogeochemical transport modelling. Simulation of component breakthrough curves from a laboratory column experiment showed very good agreement with measured concentrations. The calibrated geochemical parameters were subsequently utilized for aquifer contamination modelling. At the field scale, the overall patterns of movement of the various components were simulated correctly, but with deviations from the observations when comparing with individual components from well to well. (au)

8508 (NEI-SE–180) **Chernobyl cesium in the Swedish moose population: Effect of age, diet and habitat selection.** Nelin, P. Swedish Univ. of Agricultural Sciences, Umeaa (Sweden). Dept. of Animal Ecology. 1994. 28p. Order Number DE95612388. Source: OSTI; NTIS; INIS.

The most important game in Sweden is moose (Alces alces (L.)). To study the ^{137}Cs levels in moose, hunters were asked to send in moose meat for analysis. About 6500 samples were analysed from 1986-1993. There was a positive correlation between the fall-out of cesium from Chernobyl and the cesium concentration in moose. The differences in ^{137}Cs concentration between moose of the same age and sex, results from individual moose consuming plants of different ^{137}Cs concentrations, due to the use of different habitat types. The differences in ^{137}Cs levels between years probably depends on between-year variation in habitat utilization due to the

weather. During warm summers and autumns, moose utilize more wetlands (cool habitats during warm days) or mature forests (which are shady during sunny days) and consume the plants (of high ^{137}Cs levels) found there, whereby their meat will have a higher ^{137}Cs concentration. If, during colder summers, moose instead use farmlands or clear-cut forest areas and consume the plants (of low ^{137}Cs levels) found there, a lower ^{137}Cs concentration will be the case. The ^{137}Cs concentration in moose also fluctuates seasonally depending on diet, i.e. there are high average concentrations and large differences between individual moose killed during the plant growing season, but low ^{137}Cs concentrations and low variation between individuals and years, for moose killed during the winter. The analyses of ^{137}Cs in moose and its food plants from before and after the Chernobyl accident indicates that the ^{137}Cs from Chernobyl will stay in the northern forest ecosystem for a long time. The physical decay (30.2 years) seems to be the major factor for its disappearance from the ecosystem. I also expect that the fluctuation between years in the ^{137}Cs concentration will persist, although decrease in maximum values. 44 refs, 7 figs.

8509 (NUREG/CR–6136) **Uncertainty and sensitivity analysis of food pathway results with the MACCS Reactor Accident Consequence Model.** Helton, J.C. (Arizona State Univ., Tempe, AZ (United States)); Johnson, J.D.; Rollstin, J.A.; Shiver, A.W.; Sprung, J.L. Nuclear Regulatory Commission, Washington, DC (United States). Div. of Systems Technology; Sandia National Labs., Albuquerque, NM (United States). Jan 1995. 90p. Sponsored by Nuclear Regulatory Commission, Washington, DC (United States). DOE Contract AC04-94AL85000. (SAND–93-2372). Source: OSTI; NTIS (documentation only); ESTSC (complete software package), P.O. Box 1020, Oak Ridge, TN 37831-1020 (United States); GPO; INIS.

Uncertainty and sensitivity analysis techniques based on Latin hypercube sampling, partial correlation analysis and stepwise regression analysis are used in an investigation with the MACCS model of the food pathways associated with a severe accident at a nuclear power station. The primary purpose of this study is to provide guidance on the variables to be considered in future review work to reduce the uncertainty in the important variables used in the calculation of reactor accident consequences. The effects of 87 imprecisely-known input variables on the following reactor accident consequences are studied: crop growing season dose, crop long-term dose, milk growing season dose, total food pathways dose, total ingestion pathways dose, total long-term pathways dose, area dependent cost, crop disposal cost, milk disposal cost, condemnation area, crop disposal area and milk disposal area. When the predicted variables are considered collectively, the following input variables were found to be the dominant contributors to uncertainty: fraction of cesium deposition on grain fields that is retained on plant surfaces and transferred directly to grain, maximum allowable ground concentrations of Cs-137 and Sr-90 for production of crops, ground concentrations of Cs-134, Cs-137 and I-131 at which the disposal of milk will be initiated due to accidents that occur during the growing season, ground concentrations of Cs-134, I-131 and Sr-90 at which the disposal of crops will be initiated due to accidents that occur during the growing season, rate of depletion of Cs-137 and Sr-90 from the root zone, transfer of Sr-90 from soil to legumes, transfer of Cs-137 from soil to pasture, transfer of cesium from animal feed to meat, and the transfer of cesium, iodine and strontium from animal feed to milk.

8510 (OPRI-RM–06-1994) **Monthly results of measurements; Jun 1994.** Office de Protection contre les Rayonnements Ionisants, 78 - le Vesinet (France). 1994. 56p. (In French). Order Number DE95615468. Source: OSTI; NTIS (US Sales Only); INIS.

This report of the OPRI (Office of Protection against Ionizing Radiations) exposes the principal results concerning the routine monitoring of environmental radioactivity in France: atmospheric dusts, rainwater, surface water, underground water, sewage water, drinking water, food chain (milk, vegetables, fishes), sea water around nuclear sites and other sites. The activities of various radioisotopes are presented in tables.

8511 (ORNL/TM–12886) **Fall 1994 wildlife and vegetation survey, Norton Air Force Base, California.** Oak Ridge National Lab., TN (United States). 15 Dec 1994. 29p. Sponsored by USDOE, Washington, DC (United States);Department of Defense, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE95004875. Source: OSTI; NTIS; INIS; GPO Dep.

The fall 1994 wildlife and vegetation surveys were completed October 3-7, 1994, at Norton Air Force Base (AFB), California. Two biologists from CDM Federal Programs, the U.S. Environmental Protection Agency (EPA) regional biologist and the Oak Ridge National Laboratory (ORNL) lead biologist conducted the surveys. A habitat assessment of three Installation Restoration Project (IRP) sites at Norton Air Force Base was also completed during the fall survey period. The IRP sites include: Landfill No. 2 (Site 2); the Industrial Wastewater Treatment Plant (IWTP) area; and Former Fire Training Area No. 1 (Site 5). The assessments were designed to qualitatively characterize the sites of concern, identify potential ecological receptors, and provide information for Remedial Design/Remedial Action activities. A Reference Area (Santa Ana River Wash) and the base urban areas were also characterized. The reference area assessment was performed to provide a baseline for comparison with the IRP site habitats. The fall 1994 survey is the second of up to four surveys that may be completed. In order to develop a complete understanding of all plant and animal species using the base, these surveys were planned to be conducted over four seasons. Species composition can vary widely during the course of a year in Southern California, and therefore, seasonal surveys will provide the most complete and reliable data to address changes in habitat structure and wildlife use of the site. Subsequent surveys will focus on seasonal wildlife observations and a spring vegetation survey.

8512 (PNL–10195) **Three-dimensional conceptual model for the Hanford Site unconfined aquifer system: FY 1994 status report.** Thorne, P.D.; Chamness, M.A.; Vermeul, V.R.; Macdonald, Q.C.; Schubert, S.E. Pacific Northwest Lab., Richland, WA (United States). Nov 1994. 106p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. Order Number DE95004225. Source: OSTI; NTIS; GPO Dep.

This report documents work conducted during the fiscal year 1994 to development an improved three-dimensional conceptual model of ground-water flow in the unconfined aquifer system across the Hanford Site Ground-Water Surveillance Project, which is managed by Pacific Northwest Laboratory. The main objective of the ongoing effort to develop an improved conceptual model of groundwater flow is to provide the basis for improved numerical report models that will be capable of accurately predicting the movement of radioactive and chemical contaminant plumes in the aquifer beneath Hanford. More accurate ground-water flow models will also be useful in assessing the impacts of changes in facilities and operations. For example, decreasing volumes of operational wastewater discharge are resulting in a declining water table in parts of the unconfined aquifer. In addition to supporting numerical modeling, the conceptual model also provides a qualitative understanding of the movement of ground water and contaminants in the aquifer.

8513 (PSI–94-21) **Colloid properties in groundwaters from crystalline formations.** Degueldre, C.A. (Paul Scherrer Inst. (PSI), Villigen (Switzerland)). Paul Scherrer Inst. (PSI), Villigen (Switzerland). Sep 1994. 104p. Order Number DE95612389. Source: OSTI; NTIS; INIS.

Colloids are present in all groundwaters. The role they may play in the migration of radionuclides in the geosphere must be studied. Colloid sampling and characterisation campaigns have been carried out in Switzerland. On the bases of the results from studies in various areas, a consistent picture is emerging. The groundwater colloids in crystalline formations are predominantly comprised of phyllosilicates and silica originating from the aquifer rock. Under constant hydrogeochemical conditions, the colloid concentration is not expected to exceed 100 $ng.ml^{-1}$ when the calcium concentration is greater than 10^{-4}. However, under transient chemical or physical conditions, such as geothermal or tectonic activity, colloid generation may be enhanced and the colloid concentration may reach 10 $\mu g.ml^{-1}$ or more, if both the calcium and sodium concentrations are low. In the Nagra Crystalline Reference Water the expected colloid concentration is <100 $ng.ml^{-1}$. This can be compared, for example, to a colloid concentration of about 10 $ng.ml^{-1}$

found in Zurzach water. The small colloid concentration in the reference water is a consequence of an attachment factor for clay colloids close to 1. A model indicates that at pH 8, the nuclide partition coefficients between water and colloid (K_p) must be smaller than 10^7 $ml.g^{-1}$ if sorption takes place by surface complexation on colloids, ≡ AlOH active groups forming the dominant sorption sites. This pragmatic model is based on the competition between the formation of nuclide hydroxo complexes in solution and their sorption on colloids. Experimental nuclide sorption data on colloids are compared with those obtained by applying this model.

8514 (SKB-TR–94-09) **Tectonic framework of the Hanoe Bay area, southern Baltic Sea.** Wannaes, K.O. (Stockholms Univ. (Sweden). Dept. of Geology and Geochemistry); Floden, T. Swedish Nuclear Fuel and Waste Management Co., Stockholm (Sweden). Jun 1994. 49p. Order Number DE95615486. Source: OSTI; NTIS; INIS.

The tectonic framework and the general geologic development of the Hanoe Bay, from the Scanian coast in the west to south of Oeland in the east, has been investigated by means of reflection seismic methods. The Hanoe Bay is in this paper subdivided into four areas of different geologic settings. These are: (1) The Hanoe Bay slope, which forms a southward dipping continuation of the rigid Blekinge coastal plain. (2) The eastward dipping Kalmarsund Slope, which southwards from Oeland forms the western part of the Paleozoic Baltic Syneclise. (3) The Mesozoic Hanoe Bay Halfgraben, which forms the central and southern parts of the Hanoe Bay. The ongoing subsidence of the Halfgraben is estimated to be in the order of 20-60 m during the Quaternary. (4) The Yoldia Structural Element, which forms a deformed, tilted and possibly rotated block of Paleozoic bedrock located east of the Hanoe Bay Halfgraben. Two tectonic phases dominate the post-Paleozoic development of the Hanoe Bay, these are: (1) The Early Kimmerian phase, which initiated subsidence and reactivated older faults. (2) The Late Cretaceous phase, which is the main subsidence phase of the Hanoe Bay Halfgraben. The tectonic fault pattern of the Hanoe Bay is dominated by three directions, i.e. NW-SE, NE-SW and WNW-ESE. The two main tectonic elements of the area are the Kullen-Christiansoe Ridge System (NW-SE) and the Bornholm Gat Tectonic Zone (NE-SW). Sinistral strike-slip movements in order of 2-3 km are interpreted to have occurred along the Bornholm Gat Tectonic Zone during the late Cretaceous. 20 refs, 19 figs.

8515 (SLU-EKOMIL-R–68) **Modelling the impacts of sulphur and nitrogen deposition on forests.** Oene, Harmke van. Swedish Univ. of Agricultural Sciences, Uppsala (Sweden). Dept. of Ecology and Environmental Research. 1994. 28p. Order Number DE95737672. Source: OSTI; NTIS.

In this thesis the effects of sulphur and nitrogen deposition on forests are analysed. Two different models, an ecosystem model, and a model that describes uptake of cations, were developed with the purpose of increasing the understanding of the effects of air pollutants on the long-term nutrient availability for forest growth. In addition, the limitations and consequences of the models used to analyse effects of air pollutants on forest were studied in a comparison of different models and model descriptions. The ecosystem model showed that imbalances between nutrients in the leaf biomass of trees are causally related to decreased nutrients stores in forests affected by leaching induced by acid deposition. High forest growth levels are attained by the fertilizing effect of nitrogen deposition. The uptake model showed that aluminium affect the uptake of cations negatively through changes in root surface chemistry that can be interpreted as decreasing the uptake capacity of the roots. Increased concentrations of Ca and Mg can mitigate the negative Al effects. However, Ca and Mg appeared to be antagonists by affecting each others uptake negatively. In the field, Al may, through its inhibiting effect on uptake of cations, be a contributing factor to the nutritional imbalances observed in trees affected by air pollutants. The magnitude of this effect is also dependent on tree growth rate and supply rates of nutrients. A reduction in nitrogen deposition is required to compensate an additional scarcity of base cations induced by the recently decreased deposition of these ions. A future reduction in forest growth will occur by reduced supply rates of either base cations or nitrogen. This reduction should be viewed against the increased present-day forest growth. Attention needs therefore to be directed at the effects of air pollutants on the sustainability of forest ecosystems. 78 refs, 10 figs

8516 (SNV–4244) **Eutrophication of soil, fresh water and the sea.** Persson, Gunnar (comp.) (Swedish Environmental Protection Agency, Solna (Sweden)). Swedish Environmental Protection Agency, Solna (Sweden). 1994. 209p. Order Number DE95737655. Source: OSTI; NTIS.

The report is one in a series produced by the Swedish Environmental Protection Agency, project 'The environment in Sweden - status and trends (MIST)'.

The term 'eutrophication' is used here to refer to the increased input or availability of plant nutrients, especially nitrogen and phosphorus. It is primarily the biological effects of the increased supply of nutrients that lead to noticeable changes and problems. These effects are therefore often included in the concept of eutrophication. We distinguish however between eutrophication and its biological effects and can therefore apply the term to media in which direct biological effects are lacking, such as atmosphere and groundwater. This report is based on 5 background reports and follows the plant nutrients via the atmosphere, natural terrestrial ecosystems, agricultural systems, groundwater, watercourses/lakes and sea/coast. 195 refs, 62 figs, 21 tabs

8517 (VF-BIO–94-5) **Cadmium in Salix. A study to show the capacity of Salix to remove cadmium from farmland.** Oestman, G. (Umeaa Univ. (Sweden)). Vattenfall Utveckling AB, Vaellingby (Sweden). 16 Jun 1994. 39p. (In Swedish). Project Bioenergy-UB93-843. Order Number DE95615487. Source: OSTI; NTIS; INIS.

The aim of this report has been to show the ability of Salix to take up cadmium and how the uptake varies between different types of soil. The information that the results are based on has been obtained from analyses of soil and Salix. The samples were taken at five sites in the district around Lake Maelaren. Two or three stands were taken at each place. The factors studied were the pH, the organic matter content, and the concentration of cadmium in the soil. Salix has a good ability, relative to other crops, to remove cadmium from arable land. The cadmium uptake is 35 times higher with Salix than with straw or energy grass. Salix uptake of cadmium varies between 3 and 14% of the cadmium content in the soil that is accessible to plants. The present annual increase of cadmium in arable land is 1 g/ha, whereas the removal in a Salix plantation is 21 g Cd/ha, yr at an annual growth of 10 tonnes DM. If the Cd uptake is the same each year, then a total of 420 g Cd/ha is removed when Salix is grown over a 20-year period. This is a very large part of the topsoil's total cadmium content, which is 550 g/ha on average in Sweden. The investigation reveals no clear relationship between the Cd concentration in Salix and the concentration of Cd in the soil, the organic matter content or the pH. 22 refs, 4 figs, 2 tabs.

8518 (WHC-EP–0446-2) **Quality Assurance Project Plan for Facility Effluent Monitoring Plan activities.** Frazier, T.P. Westinghouse Hanford Co., Richland, WA (United States). 20 Oct 1994. 73p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95002361. Source: OSTI; NTIS; INIS; GPO Dep.

This Quality Assurance Project Plan addresses the quality assurance requirements for the activities associated with the Facility Effluent Monitoring Plans, which are part of the overall Hanford Site Environmental Protection Plan. This plan specifically applies to the sampling and analysis activities and continuous monitoring performed for all Facility Effluent Monitoring Plan activities conducted by Westinghouse Hanford Company. It is generic in approach and will be implemented in conjunction with the specific requirements of the individual Facility Effluent Monitoring Plans.

8519 (WSRC-TR–94-0345) **Mixed Waste Management Facility groundwater monitoring report. Second quarter 1994.** Chase, J.A. Westinghouse Savannah River Co., Aiken, SC (United States). Sep 1994. 585p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE95002663. Source: OSTI; NTIS; GPO Dep.

Currently, 125 wells monitor groundwater quality in the uppermost aquifer beneath the Mixed Waste Management Facility

(MWMF) at the Savannah River Site. Samples from the wells are analyzed for selected heavy metals, indicator parameters, radionuclides, volatile organic compounds, and other constituents. During second quarter 1994, chloroethene (vinyl chloride), 1,1-dichloroethylene, gross alpha, lead, tetrachloroethylene, trichloroethylene, or tritium exceeded final Primary Drinking Water Standards (PDWS) in approximately half of the downgradient wells at the MWMF. Consistent with historical trends, elevated constituent levels were found primarily in Aquifer Zone. As in previous quarters, tritium and trichloroethylene were the most widespread elevated constituents during second quarter 1994. Sixty-two of the 125 monitoring wells contained elevated tritium activities. Trichloroethylene concentrations exceeded the final PDWS in 23 wells. Chloroethene, 1,1-dichloroethylene, lead, and tetrachloroethylene, elevated in one or more wells during second quarter 1994, also occurred in elevated levels during first quarter 1994. These constituents generally were elevated in the same wells during both quarters. Gross alpha, which was not elevated in any well during first quarter 1994, was elevated in one well during second quarter. Copper, mercury, and nonvolatile beta were elevated during first quarter 1994 but not during second quarter.

8520 (WSRC-TR–94-0490) **F-Area Acid/Caustic Basin groundwater monitoring report: Third quarter 1994.** Westinghouse Savannah River Co., Aiken, SC (United States). Dec 1994. 80p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE95005892. Source: OSTI; NTIS; GPO Dep.

During third quarter 1994, samples from the FAC monitoring wells at the F-Area Acid/Caustic Basin were collected and analyzed for herbicides/pesticides, indicator parameters, metals, nitrate, radionuclide indicators, volatile organic compounds, and other constituents. Piezometer FAC 5P and monitoring well FAC 6 were dry and could not be sampled. New monitoring wells FAC 9C, 10C, 11C, and 12C were sampled for the first time during third quarter. Analytical results that exceeded final Primary Drinking Water Standards (PDWS), other Savannah River Site (SRS) Flag 2 criteria, or the SRS turbidity standard of 50 NTU during the quarter were as follows: gross alpha exceeded the final PDWS and aluminum, iron, manganese, and total alpha-emitting radium exceeded the SRS Flag 2 criteria in one or more of the FAC wells. Turbidity exceeded the SRS standard in wells FAC 3 and 10C. Groundwater flow direction and rate in the water table beneath the F-Area Acid/Caustic Basin were similar to past quarters.

8521 (WSRC-TR–94-0493) **P-Area Acid/Caustic Basin groundwater monitoring report: Third quarter 1994.** Westinghouse Savannah River Co., Aiken, SC (United States). Dec 1994. 60p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE95005891. Source: OSTI; NTIS; INIS; GPO Dep.

During third quarter 1994, groundwater from the six PAC monitoring wells at the P-Area Acid/Caustic Basin was analyzed for herbicides/pesticides, indicator parameters, metals, nitrate, radionuclide indicators, and other constituents. Monitoring results that exceeded the final Primary Drinking Water Standards (PDWS) or the Savannah River Site (SRS) flagging criteria or turbidity standard during the quarter are discussed in this report. During third quarter 1994, no constituents exceeded the final PDWS. Aluminum exceeded its SRS Flag 2 criterion in all six PAC wells. Iron and manganese exceeded Flag 2 criteria in three wells, while turbidity was elevated in one well. Groundwater flow direction and rate in the water table beneath the P-Area Acid/Caustic Basin were similar to past quarters.

8522 (WSRC-TR–94-0495) **Sanitary Landfill groundwater monitoring report: Third quarter 1994.** Westinghouse Savannah River Co., Aiken, SC (United States). Nov 1994. 238p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE95005890. Source: OSTI; NTIS; GPO Dep.

This report contains analytical data for samples taken during third quarter 1994 from wells of the LFW series located at the Sanitary Landfill at the Savannah River Site (SRS). The data are submitted in reference to the Sanitary Landfill Operating Permit (DWP-087A). The report presents monitoring results that equaled or exceeded the Safe Drinking Water Act final Primary Drinking Water Standards (PDWS) or screening levels, established the US Environmental Protection Agency, the South Carolina final PDWS for lead (Appendix A), or the SRS flagging criteria.

5403 Environmental Sciences, Aquatic

Refer also to citation(s) 7252, 7298, 7303, 7304, 7306, 7442, 7479, 7784, 7818, 7856, 7861, 8435, 8451, 8463, 8476, 8487, 8510, 8516, 8518

8523 (DOE/BP/25105–1) **Ecosystem diagnosis and treatment planning model as applied to supplementation. Model description, user guide, and theoretical documentation for the model introduce in the summary report series on supplementation in the Columbia basin.** Lestelle, L.C. (Mobrand Biometrices, Inc., Vashon Island, WA (United States)); Lichatowich, J.A.; Mobrand, L.E.; Cullinan, V.A. Mobrand Biometrics, Inc., Vashon Island, WA (United States). May 1994. 136p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AM79-92BP25105. Order Number DE95003120. Source: OSTI; NTIS; GPO Dep.

This document describes the formulation and operation of a model designed to assist in planning supplementation projects. It also has application in examining a broader array of questions related to natural fish production and stock restoration. The model is referred to as the Ecosystem Diagnosis and Treatment (EDT) Model because of its utility in helping to diagnose and identify possible treatments to be applied to natural production problems for salmonids. It was developed through the Regional Assessment of Supplementation Project (RASP), which was an initiative to help coordinate supplementation planning in the Columbia Basin. The model is operated within the spreadsheet environment of Quattro Pro using a system of customized menus. No experience with spreadsheet macros is required to operate it. As currently configured, the model should only be applied to spring chinook; modifications are required to apply it to fall chinook and other species. The purpose of the model is to enable managers to consider possible outcomes of supplementation under different sets of assumptions about the natural production system and the integration of supplementation fish into that system. It was designed to help assess uncertainty and the relative risks and benefits of alternative supplementation strategies. The model is a tool to facilitate both planning and learning; it is not a predictive model. This document consists of three principal parts. Part I provides a description of the model. Part II is a guide to running the model. Part III provides theoretical documentation. In addition, a sensitivity analysis of many of the model's parameters is provided in the appendix. This analysis was used to test whether the model produces consistent and reasonable results and to assess the relative effects of specific parameter inputs on outcome.

8524 (DOE/ER/60355–T3) **[Circulation and exchange processes on the South Atlantic Bight Continental Shelf]. [Progress summary for 1986].** Miami Univ., Coral Gables, FL (United States). [1986]. 21p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG05-85ER60355. Order Number DE95005816. Source: OSTI; NTIS; GPO Dep.

A continuation of the physical oceanography program to investigate circulation and exchange processes on the South Atlantic Bight (SAB) Continental Shelf is proposed. The transport and dispersal of materials entering the inner shelf zone with river discharge is not well understood at present. Climatological data, satellite imagery, and numerical modeling results indicate two removal routes for these nearshore waters: northeast transport and offshore exchange between Cape Fear and Savannah during the spring and summer when maximum run-off and northward winds prevail; and southward transport and offshore exchange near Cape Canaveral during the fall when southward winds prevail. We have conducted interdisciplinary experiments to investigate the transport processes in the inner to outer shelf between Savannah, Georgia and Cape Fear, North Carolina. In addition we propose to continue synthesis and interpretation of current measurements. The analyses will focus on determining the coupling mechanisms of inner shelf and outer shelf waters with special emphasis placed on resolving the modes and rates of shelf water removal.

8525 (DOE/ER/60743–T1) **Water Science and Technology Board. Annual report 1991.** National Research Council, Washington, DC (United States). Water Science and Technology Board. [1995]. 32p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG05-89ER60743. Order Number DE95005512. Source: OSTI; NTIS; GPO Dep.

This report summarizes the activities of the Water Science and Technology Board during 1991. The WSTB is intended to be a dynamic forum, a mechanism by which the broad community of water science, technology, and policy professionals can help assure high-quality national water programs. The principal products of WSTB studies are written reports which cover a wide range of water resources issues of current national concern. A few recent examples are: Restoration of aquatic ecosystems - science, technologies and public policy; Water transfers in the West - efficiency, equity and the environment; Opportunities in the hydrologic sciences; and Ground water models - scientific and regulatory applications. Projects completed, ongoing studies and published reports are described in detail in their respective sections of this report.

8526 (DOE/ER/60743–T2) **Water Science and Technology Board. Annual report 1992-1993.** National Academy of Sciences - National Research Council, Washington, DC (United States). [1995]. 32p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG05-89ER60743. Order Number DE95005513. Source: OSTI; NTIS; GPO Dep.

This report summarizes the activities of the Water Science and Technology Board during 1992. The WSTB is intended to be a dynamic forum, a mechanism by which the broad community of water science, technology, and policy professionals can help assure high-quality national water programs. The principal products of WSTB studies are written reports which cover a wide range of water resources issues of current national concern. A few recent examples are: Managing wastewater in coastal urban areas; Ground water vulnerability assessment; Water transfers in the West - efficiency, equity and the environment; and Opportunities in the hydrologic sciences. Projects completed, ongoing studies and published reports are described in detail in their respective sections of this report.

8527 (DOE/ER/60743–T3) **Water Science and Technology Board. Annual report 1993-1994.** National Academy of Sciences - National Research Council, Washington, DC (United States). [1995]. 36p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG05-89ER60743. Order Number DE95005514. Source: OSTI; NTIS; GPO Dep.

This report summarizes the activities of the Water Science and Technology Board during 1993-1994. The WSTB is intended to be a dynamic forum, a mechanism by which the broad community of water science, technology, and policy professionals can help assure high-quality national water programs. The principal products of WSTB studies are written reports which cover a wide range of water resources issues of current national concern. A few recent examples are: Alternatives for ground water cleanup; Managing wastewater in coastal urban areas; and, Water transfers in the West - efficiency, equity and the environment. Projects completed, ongoing studies and published reports are described in detail in their respective sections of this report.

8528 (DOE/ER/60934–T1) **Ocean Studies Board. Annual report 1993.** National Academy of Sciences, Washington, DC (United States). Ocean Studies Board. [1995]. 27p. Sponsored by USDOE, Washington, DC (United States):National Science Foundation, Washington, DC (United States);Department of Defense, Washington, DC (United States);National Oceanic and Atmospheric Administration, Washington, DC (United States);Geological DOE Contract FG05-90ER60934. Order Number DE95005455. Source: OSTI; NTIS; GPO Dep.

The Ocean Studies Board (OSB), created in July 1985, serves as an independent advisor to the federal government on matters of ocean science and policy. It is a unit of the Commission on Geosciences, Environment, and Resources of the National REsearch Council (NRC). The OSB is a multi-disciplinary body with representation from the fields of marine biology and biological oceanography, chemical oceanography, physical oceanography, marine geology and geophysics, engineering and marine policy. The OSB provides leadership, builds consensus, and gives timely, proactive advice to the nation on ocean science and policy issues. OSB activities fall into three broad categories: promoting the health of ocean sciences in the United States, encouraging the protection and wise use of the ocean and its resources, and applying ocean science to improve national security. A brief description of 1993 activities along with activities planned in 1994 is presented.

8529 (DOE/ER/60934–T2) **Ocean Studies Board. Annual report 1992.** National Academy of Sciences, Washington, DC (United States). Ocean Studies Board. [1995]. 26p. Sponsored by USDOE, Washington, DC (United States);National Science Foundation, Washington, DC (United States);Department of Defense, Washington, DC (United States);National Oceanic and Atmospheric Administration, Washington, DC (United States);Geological DOE Contract FG05-90ER60934. Order Number DE95005454. Source: OSTI; NTIS; GPO Dep.

The Ocean Studies Board (OSB), created in July 1985, serves as an independent advisor to the federal government on matters of ocean science and policy. It is a unit of the Commission on Geosciences, Environment, and Resources of the National REsearch Council (NRC). The OSB is a multi-disciplinary body with representation from the fields of marine biology and biological oceanography, chemical oceanography, physical oceanography, marine geology and geophysics, engineering and marine policy. The OSB provides leadership, builds consensus, and gives timely, proactive advice to the nation on ocean science and policy issues. OSB activities fall into three broad categories: promoting the health of ocean sciences in the United States, encouraging the protection and wise use of the ocean and its resources, and applying ocean science to improve national security. A brief description of 1992 activities along with activities planned in 1993 is presented.

8530 (GKSS–94/E/10) **Inventory and sensitivity mapping in the German Wadden Sea. June 1987 - June 1993. Final report.** Bernem, K.H. van (GKSS-Forschungszentrum Geesthacht GmbH (Germany). Inst. fuer Physik); Krasemann, H.L.; Mueller, A.; Patzig, S.; Riethmueller, R. GKSS-Forschungszentrum Geesthacht GmbH (Germnay). Jan 1994. 160p. (In German). Sponsored by Umweltbundesamt, Berlin (Germany). Contract UFOPLAN 10204232. (UBA-FB–94-077). Order Number DE95738696. Source: OSTI; NTIS (US Sales Only); INIS.

The project 'Thematische Kartierung und Sensitivitaetsraster des Deutschen Wattenmeeres' includes a methodically uniform inventory of the whole German Wadden Sea performed between 1987 and 1992. The inventory is based on quantitative and descriptive data and contains a documentation of temporary aspects. The project acts as a nucleus for the development of the Wadden Sea information System WATiS. The project forms the basis for direct applications for nature protection and oil-spill measures; in addition, a procedure to deliminate representative areals is demonstrated which can be used for example in the 'Trilateral Monitoring and Assessment Program' for the Wadden Sea. With the coupling to the computerbased maritime environmental management system 'REMUS' (presently developed) the prerequisites are generated to combine logistical, technical and scientific techniques for provision and combat measures. (orig.)

8531 (IAEA-TECDOC–721) **Water resources in the Sahel. Hydrogeological and hydrological studies in West Africa by isotopic techniques. Statement of accounts of studies carried out in the framework of the project RAF/8/012: Isotopic hydrology in Sahelian countries.** International Atomic Energy Agency, Vienna (Austria). Oct 1993. 211p. (In French). Order Number DE95615467. Source: OSTI; NTIS (US Sales Only); INIS.

International Atomic Energy Agency (IAEA) supports various projects on isotopic applications for environmental studies. This document contains papers presented on the use of isotopic analysis for hydrological studies in Sahel region of Africa. All the papers in this document are in French with English title and abstract. Refs, figs and tabs.

8532 (IAEA-TECDOC–721, pp. 23-38) **Isotopic characteristics of meteoric water and groundwater in the Sahelo-Sudanese zone.** Joseph, A. (Niamey Univ., Niamey (Niger). Faculte des Sciences); Frangi, J.P.; Aranyossy, J.F. International Atomic Energy Agency, Vienna (Austria). Oct 1993. (In

French). In *Water resources in the Sahel. Hydrogeological and hydrological studies in West Africa by isotopic techniques. Statement of accounts of studies carried out in the framework of the project RAF/8/012: Isotopic hydrology in Sahelian countries.* 211p. Order Number DE95615467. Source: OSTI; NTIS (US Sales Only); INIS.

It is considered that, in the Sahelo-Soudanese zone, the stable isotopic composition of water in the phreatic acquifers is representative of the original mean rainfall which has contributed to groundwater recharge. Statistical treatment of data on isotopic composition of rainfall and groundwater has evidence a Est-West gradient of -0.084 deg./00 100 km^{-1}. This suggests a supply of water vapor through the zonal flows (Est African Jet, Tropical Easterly Jet and Easterly Waves) and an increasing contribution of the Indian Ocean evaporation source in regard to that the Guinean Monsoon. The relatively low value of the isotopic gradient also indicates the importance of the continental water recycling through evapotranspiration. A model based on the conservation of isotopic masses is presented, taking into account this recycling processes. The remaining vapor fraction is calculated on the Est-West transect between Djibouti and Dakar in relation to evapotranspiration ratio. (author). 56 refs, 7 figs, 1 tab.

8533 (IAEA-TECDOC–721, pp. 147-156) **Application of tracer dilution techniques for flow rate measurements in Sahelian Hydrology: Examples in Mali.** Fofana, A. (Direction Nationale de l'Hydraulique et de l'Energie, Bamako (Mali)); Bedimo, J.P.; Mar, B.; Hanikoi, A. International Atomic Energy Agency, Vienna (Austria). Oct 1993. (In French). In *Water resources in the Sahel. Hydrogeological and hydrological studies in West Africa by isotopic techniques. Statement of accounts of studies carried out in the framework of the project RAF/8/012: Isotopic hydrology in Sahelian countries.* 211p. Order Number DE95615467. Source: OSTI; NTIS (US Sales Only); INIS.

This paper presents a summary of the techniques commonly used at the Directorate of Hydraulics in Bamako for river flow measurement by dilution of tracers; the instantaneous injection method and the constant-rate injection method. The tracer techniques, systematically used during the last past years in Mali, has been proven to be particularly powerful and well-suited to the Sahelian hydrology where the hydrodynamic conditions (sudden and violent floods) unable classical flow measurements. An example of application is given with the determination of the stage discharge rating curve of the Dourou wade in the "pays Dogon". (author). 7 refs, 4 figs, 3 tabs.

8534 (IAEA-TECDOC–721, pp. 157-167) **The use of nuclear techniques in hydrosedimentology: Principle and application in Mali.** Alpha, A. (Ecole Nationale d'Ingenieurs de Bamako, Bamako (Mali)); Sissoko, M.; Diarra, S. International Atomic Energy Agency, Vienna (Austria). Oct 1993. (In French). In *Water resources in the Sahel. Hydrogeological and hydrological studies in West Africa by isotopic techniques. Statement of accounts of studies carried out in the framework of the project RAF/8/012: Isotopic hydrology in Sahelian countries.* 211p. Order Number DE95615467. Source: OSTI; NTIS (US Sales Only); INIS.

The evaluation of suspended sediment concentrations in water by means of nuclear techniques is based on the measurement of gamma ray attenuation due to its interaction with particles. After a brief recall of the main effects of nuclear radiation on atoms (photoelectric effect, Compton effect and "materialisation" effect), their application is given in the field of hydrosedimentoloy through a short description of the two types of nuclear gauges commonly used: (1) the diffusion gauges, with the nuclear source fixed on the same than the detector, require a relatively high energy (660 Kev) supplied by a cesium-137 source; (2) the transmission gauges, where the sample to be studied is placed between the sources and the detector, need less energy (60 KeV) generally provided by an americium-241 source. Diffusion and transmission gauges are available in Mali, the first one ("JTD3") is mainly built for in-situ measurements of non-cohesive sediment deposits while the second type is used for laboratory determination of compaction processes and in-situ turbidity measurements in floods. Examples of calibration curves and some applications in Mali are given. (author). 16 refs, 5 figs, 2 tabs.

8535 (IAEA-TECDOC–721, pp. 201-207) **Comment on the isotopic measures of Niger in Banankoro and of Bani in the Douna-San region.** Gourcy, L. (ORSTOM, Bamako (Mali)). International Atomic Energy Agency, Vienna (Austria). Oct 1993. (In French). In *Water resources in the Sahel. Hydrogeological and hydrological studies in West Africa by isotopic techniques. Statement of accounts of studies carried out in the framework of the project RAF/8/012: Isotopic hydrology in Sahelian countries.* 211p. Order Number DE95615467. Source: OSTI; NTIS (US Sales Only); INIS.

During the eighties a program conducted by the hydrological division of the National Board for Hydrology and Energy supported by projects PNUD/DTCD MLI/67/004 and MLI/84/005 and the collaboration by the IAEA has made it possible to carry out isotope studies of different aquifers in Mali. Two series of samples have been taken by ORSTOM (Office de la Recherche Scientific et Technique d'Outre-Mer, i.e., the office for scientific and technical research carried out overseas) on the river Bani at Douna from July 9, 1990, until April 18, 1991. The analysis of the stable isotopes ^{18}O and ^{2}H carried out by the IAEA has allowed to complete this study, which underscores the connections between the rivers and downstream layers of the inner delta. The present document briefly reports on (i) findings about the Niger at Banankoro (annual variation; relation between $\delta^{18}O$ and $\delta^{2}H$); the Bani at Douna (same topics as for (i)); (iii) a comparison between the Bani at San and the Bani at Douna; (iv) a study of the region between Douna and San. 12 figs.

8536 (IAEA-TECDOC–721, pp. 209-211) **Comment on the evolution of the isotopic composition of rainfall from a squall line (Niamey, Niger).** Joseph, A. (Paris-7 Univ., 75 (France). U.F. Environnement); Frangi, J.P.; Aranyossy, J.F. International Atomic Energy Agency, Vienna (Austria). Oct 1993. (In French). In *Water resources in the Sahel. Hydrogeological and hydrological studies in West Africa by isotopic techniques. Statement of accounts of studies carried out in the framework of the project RAF/8/012: Isotopic hydrology in Sahelian countries.* 211p. Order Number DE95615467. Source: OSTI; NTIS (US Sales Only); INIS.

The atmosphere of the Sahel consists of three layers of different humidity, dynamics and water vapor origin. In general, along with the ascent of the intertropical convergence zone, the humid air masses from the gulf of Guinea move more and more to the lower atmospheric layers. The water vapor in the upper layers is transported by either the East African Jet stream or by the Tropical Jet stream from the East. It is presently recognized that the origin of this water vapor is to be found (i) in the recycling of continental vapor that evaporated along the edge of the Sahel, and (ii) at the level of evaporating surfaces of the Indian ocean. In this respect stable isotope studies of precipitation have made it possible to delineate both the importance of the contributions from the flux from the east and the importance of evaporation in the water balance of the Sahel. This particular document reports on water samples drawn from a squall line over Niamey on May 4, 1991. The level of precipitation and the deuterium and ^{18}O concentrations were measured on the basis of 18 samples. The relation between the deuterium and ^{18}O concentrations from the squall line is presented as a function of real time, as is the amount of excess deuterium. The latter is constant at first while heavy isotope concentrations diminish. The initial precipitation seems to originate from the lower atmospheric layers of the Guinean monsoon. From 10:30 am the heavy isotope concentration no longer diminishes but instead fluctuates within a limited domain, suggesting the East African Jet stream as the source. In the samples taken between noon and 3 pm the heavy isotope concentrations increases strongly while the excess deuterium decreases strongly, suggesting the source to be the Indian ocean. 5 refs, 2 figs.

8537 (INIS-mf–14436, pp. O15.1-O15.8) **Overview of results of a detailed survey of contamination of the Ploucnice flood plain.** Kuehn, P. (DIAMO s.p., Straz pod Ralskem (Czech Republic)). No corporate text available. Oct 1993. 157p. (In Czech). (CONF-9310403–: The mining Pribram in science and technology, Pribram (Czech Republic), 13-16 Oct 1993). In *The mining Pribram in science and technology. Section O: Mining and the environment.* Order Number DE95612417. Source: OSTI; NTIS (US Sales Only); INIS.

The results are given of an examination of the contamination of the Ploucnice river floodplain. Investigated were the mineral composition of sediments, the organic carbon content, and the heavy metal content. Gamma spectrometric measurements showed that the concentrations of natural radioisotopes of Th, U, Ra and K fluctuated considerably. Radioactivity was distributed very nonuniformly, no large areas with systematically elevated radiation doses were detected. The size of the largest contaminated areas was 42 x 75 and 25 x 40 m. (J.B.). 4 tabs., 6 refs.

8538 (INIS-mf–14436, [pp. O14.1-O14.24]) **Methodology of model approaches to ground water reclamation at the Straz deposit.** Novak, J. (DIAMO s.p., Straz pod Ralskem (Czech Republic)). No corporate text available. Oct 1993. 157p. (In Czech). (CONF-9310403–: The mining Pribram in science and technology, Pribram (Czech Republic), 13-16 Oct 1993). In *The mining Pribram in science and technology. Section O: Mining and the environment.* Order Number DE95612417. Source: OSTI; NTIS (US Sales Only); INIS.

Mathematical models for solving sanitation problems of the Straz deposit are given. Uranium has been extracted hydrochemically from the deposit, which has brought serious disturbance of the underground. Attention is paid to structural and situational models, thermodynamic and kinetic models, mass flow and transport models, and economic and optimization models. The goal of the modelling consists in preparing documents and proposals for sanitation scenarios, for determining environmental burden limits, for making decisions concerning chemical extraction, and for optimizing procedures to attain the specified limits. (J.B.). 8 figs.

8539 (INIS-mf–14469, pp. 76) **Transport of radionuclides in fresh water stream.** Abdelmalik, W.E.Y.; Ibrahim, A.S.; Elshinawy, R.M.K.; Kamel, N.H. Atomic Energy Establishment, Cairo (Egypt). 1991. 106p. (CONF-9110549–: 2. radiation protection and Civil Defence Department Conference, Cairo (Egypt), 7-16 Oct 1991). In *Radiation Protection and Civil defence Department Conference.* Order Number DE95617966. Source: OSTI; NTIS (US Sales Only); INIS.

The physico chemical and mineralogical properties of Esmailia canal bottom sediments (ICBS) showed that it is mainly silica (major) with some montmorillonite and kaolinite (minor). Sorption of the radionuclides by the ICBS was found to follow a three phase process; rapid, moderate and slow phase reaction. The reaction half life of each phase was calculated for the different isotopes studied. The sorption capacity for different size fractions has been calculated and the cumulative sorption capacity of all sizes have been compared with that of the natural bottom sediment. The sorption capacity varied with PH and increased linearly with carrier concentration according to the freundlich type of isotherm. measurements of the natural radioactivity level showed the presence of trace amounts of natural radionuclides in the ICBS environment.

8540 (INIS-mf–15086) **Cadastre of discharges into bodies of water. Direct discharges. Year of survey: 1986.** Hamburger Umweltberichte, v. 21/88. Umweltbehoerde, Hamburg (Germany). Amt. fuer Umweltschutz. May 1988. 33p. (In German). Order Number DE95738942. Source: OSTI; NTIS (US Sales Only); INIS.

By pointing out pollution hotspots, this cadastre of discharges of effluents into bodies of water in Hamburg offers the possibility to decide on remedial measures. Comparatively heavy discharges of oxygen-consuming substances in Hamburg currently still come from the sector sewage treatment plants. However, because of the Dradenau sewage treatment plant having meanwhile become operational, this load is due to fall to approximately 10% of the values indicated here. The necessity for such a cut was also confirmed by the resolutions passed at the second international conference for the protection of the North Sea. These resolutions stipulate the halving of discharges of long-lived, toxic, and biologically accumulated substances as well as nutrients into the North Sea by 1995. (orig./EF)

8541 (IVL-B–1167) **Phthalates in Swedish sediments.** Parkman, H.; Remberg, M. Swedish Environmental Research Inst., Stockholm (Sweden). Jan 1995. 27p. Order Number DE95737680. Source: OSTI; NTIS.

With Swedish summary.

The objectives of the study were to produce reliable 'background' data of phthalate concentrations in sediments, and to assess the relative importance of phthalate input from both diffuse sources and from point-sources. Much effort was first concentrated on adopting new laboratory and sampling practices with a minimum of contamination risks. Thereafter, surface sediments (0-2 cm) from different types of environments were sampled and analysed for the following nine substances and mixtures: DMP, DEP, DEHP, DBP, BBP, DnOP, DnNP, DINP and DIDP. The sampling stations were selected in order to represent: * 'background' concentrations from different parts of Sweden (remote lakes), * a gradient of increasing anthropogenic influence, downstream of a river system and * water-bodies acting as recipients of 'points-sources' (plastic industries). One sediment core was also analysed for depth profiles of phthalates. DEHP varied between 0.01 and 0.4 μg/g dw in the remote lakes. The concentrations of DBP and BBP were 0-0.9 μg/g dw while the other phthalates were mostly undetectable. In the gradient with increasing anthropogenic influence, DEHP concentrations (normalised to organic content in the sediments), increased downstream. The DEHP-concentrations at the two points sources were 33 and 47 μg/g dw respectively, which represent more than a ten-fold decrease compared to concentrations measured in 1983. Comparatively high concentrations of the phthalate mixture DINP was measured in the sediments at one of the points sources. 17 refs, 7 figs, 4 tabs

8542 (Juel–2921) **Reactive liquid/liquid extraction of heavy metals from landfill seepage waters. Its characterisation and application.** Woller, N. Forschungszentrum Juelich GmbH (Germany). Inst. fuer Chemie 4 - Angewandte Physikalische Chemie; Duesseldorf Univ. (Germany). Jun 1994. 154p. (In German). Order Number DE95738699. Source: OSTI; NTIS (US Sales Only); INIS.

This study demonstrates the applicability of liquid-liquid extraction by means of the commercial complexers LIX26^R and LIX84^R to heavy metal removal from waste waters. The composition of this oil-soluble complex is MeR_2, where Me denotes Hg^{2+}, Cd^{2+}, Zn^{2+}, Cu^{2+}, and Ni^{2+}, and R denotes LIX84^R. This composition makes the complex electrically neutral, and all polar groups are located inside the molecule. The extraction efficiency of the complexer LIX84^R for the various metal ions is evident in the succession Cu^{2+}, Ni^{2+} >> Zn^{2+} > Hg^{2+} > Cd^{2+}. These heavy metal ions are even readily extractable at chloride concentrations of up to 1 mol/l. As the structure of the complexer is that of an oil-soluble surfactant with complexing properties, it accumulates at the phase boundary between oil and water. Measurement of interfacial tension in various solvent systems showed that the polar solvent chloroform permits only a weak accumulation of the complexer (400 nmol/m^2), whereas the unpolar solvent kerosine permits greater accumulation specifically on the water side of the phase boundary (1958 nmol/m^2). Organic solvents solvate the complexer so well, that it is even removed from the air side of the phase boundary. The differing accumulation of the complexer at the water/oil phase boundary explains the differing increase of phase separation time for polar and unpolar solvents. (orig.)

8543 (LUTVDG-TVVR–1012) **Thermal bar dynamics. Spring thermo- and hydrodynamics in large temperate lakes.** Malm, J. Lund Univ. (Sweden). Dept. of Water Resources Engineering. 1994. 44p. Order Number DE95737671. Source: OSTI; NTIS.

This thesis present studies of the thermo- and hydrodynamics in large temperate lakes in spring, with special focus on the thermal bar. The thermal bar is defined as a zone of descending water with the temperature of maximum density. The character of the temperature distribution during spring is of importance as it affects the condition for vertical mixing, which in turn affect water quality and biological activity. The practical importance of the thermal bar is that it inhibits exchange of water between the on- and offshore regions. The objectives of this work are to determine the main mechanisms that govern the thermal bar progression, analyze the thermal structure and its development in large temperate lakes, and investigate the circulation associated with the thermal bar, with focus on the relative importance of density-induced currents compared to wind-driven currents. The investigation methods consist of field measurements, analysis of the water surface temperature structure by satellite data, and usage of analytical and numerical

models. The thermal bar is initiated at the shore and moves towards the deeper parts of the lake as spring heating proceeds. The three main factors that determine the thermal bar progression are surface heat flux, bottom topography, and heat transfer from the near-shore region to the thermal bar zone. The measured temperature distributions are in good agreement with other field observations during spring, with a stably stratified near-shore region on the shore side of the thermal bar, and a connectively mixed deep water region on the offshore side. The stable stratification may be destroyed by wind action during early spring. Still, the density-induced currents are of importance in a longer time perspective, especially when the thermal bar zone is characterized by large horizontal temperature gradients. 35 refs, 9 figs, 1 tab

8544 (ORNL/CDIAC–74) **Handbook of methods for the analysis of the various parameters of the carbon dioxide system in sea water. Version 2.** Dickson, A.G.; Goyet, C. (eds.). Oak Ridge National Lab., TN (United States). Sep 1994. 197p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE95004743. Source: OSTI; NTIS; GPO Dep.

The collection of extensive, reliable, oceanic carbon data is a key component of the Joint Global Ocean Flux Study (JGOFS). A portion of the US JGOFS oceanic carbon dioxide measurements will be made during the World Ocean Circulation Experiment Hydrographic Program. A science team has been formed to plan and coordinate the various activities needed to produce high quality oceanic carbon dioxide measurements under this program. This handbook was prepared at the request of, and with the active participation of, that science team. The procedures have been agreed on by the members of the science team and describe well tested methods. They are intended to provide standard operating procedures, together with an appropriate quality control plan, for measurements made as part of this survey. These are not the only measurement techniques in use for the parameters of the oceanic carbon system; however, they do represent the current state-of-the-art for ship-board measurements. In the end, the editors hope that this handbook can serve widely as a clear and unambiguous guide to other investigators who are setting up to analyze the various parameters of the carbon dioxide system in sea water.

8545 (PINSTECH-RIAD–139) **Coliform bacteria as in indicator of sewerage water mixing with drinking water sources in Rawalpindi city.** Mashiatullah, A. (Pakistan Inst. of Nuclear Science and Technology, Islamabad (Pakistan). Radiation and Isotope Application Div.); Qureshi, R.M.; Bibi, S.; Javed, T.; Shah, Z.; Sajjad, M.I. Pakistan Inst. of Nuclear Science and Technology, Islamabad (Pakistan). Radiation and Isotope Application Div. Dec 1993. 17p. Order Number DE95615488. Source: OSTI; NTIS (US Sales Only); INIS.

7 fig.

The coliform group of bacteria are consider to be one of the prominent indicators of surface/groundwater pollution as their presence in drinking water sources shows that water has been in contact with soil, plants, septic tanks or sewerage lines/drains. As a part of surface/groundwater pollution studies in various areas of Rawalpindi city coliform bacteria have been determined in the available drinking sources to evaluate their possible connection with the nearby septic tanks and sewerage lines/drains. Selective water samples were tapped from 72 domestic dug wells, and 98 municipal corporation tube-wells and associated water supply lines in some poorly drained areas of Rawalpindi. These samples were analyzed using membrane filter technique. In general, the sampled areas have indicated poor water quality w.r.t. coliform activity. 52% samples of the collected samples have indicated presence of Ecoli. Of these, 73% samples mostly collected from the poorly drained areas have shown significant counts of Ecoli. These water are rendered unfit for drinking purposes. Thirteen water samples collected indicated toxic levels of Ecoli in the municipal water supply caused due to a known leakage in the main domestic water supply line. The presence of coliform in the tube-well water supply taps are thus attributed to ruptures in the underground water supply lines. Present study reveals that general sanitary condition and water quality in the city are poor and that there is an urgent need of improvement in the water treatment and distribution systems by the concern quaters. (Orig./A.B.). 7 fig.

8546 (PNL-SA–24935) **Onset time and strength of oceanic deep convection diagnosed from an ocean large-eddy simulation model.** Denbo, D.W. (Pacific Northwest Lab., Sequim, WA (United States)). Pacific Northwest Lab., Richland, WA (United States). Jan 1995. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-950153–1: 4. conference on polar meteorology and oceanography, Dallas, TX (United States), 15-20 Jan 1995). Order Number DE95004548. Source: OSTI; NTIS; GPO Dep.

Deep convection has an important role in the large-scale thermohaline circulation, which in turn plays a central part in determining global climate. Manabe and Stouffer's climate simulations have shown that the thermal and dynamic structure of the oceans have pronounced changes in model climates with increased CO_2. In their simulations, the addition of low-salinity surface water at high latitudes prevents the ventilation of the deep ocean, thus reducing or in some cases nearly extinguishing the thermohaline circulation. Siegenthaler and Sarmiento remarked that whereas the ocean is the largest of the rapidly exchanging global carbon reservoirs and a major sink for anthropogenic carbon, this uptake capacity become available only when the whole ocean is chemically equilibrated with the new atmospheric CO_2 concentration. The dynamics of the oceanic uptake of CO_2 is therefore strongly determined by the rate of downward transport of CO_2-laden water from surface to depth. The importance of deep convection in moderating the uptake of CO_2 by the ocean and its role in the meridional circulation, which affects climate by transporting heat from the tropics to the polar regions, motivates this research. The experiments described here were designed to study the sensitivity of the onset time and strength of deep convection to changes in the heat flux, latent heat flux, and perturbations of the surface mixed-layer temperature and salinity.

8547 (STUDSVIK-ES–94-32) **Density-driven displacement of pore water as possible factor affecting the vertical distribution of Chernobyl-derived radionuclides in a Baltic Sea sediment.** Evans, S.; Holby, O. Studsvik Eco and Safety AB, Nykoeping (Sweden). 7 Jun 1994. 27p. Project SSI-P-487.88. Order Number DE95612428. Source: OSTI; NTIS; INIS.

The vertical distribution of radionuclides in the bottom sediment of Gaevle Bay, southern Bothnian Sea, was investigated after the Chernobyl fallout. Sediment cores collected two years after the initial fallout revealed the highest radionuclide concentrations found in the Baltic Sea, reflecting the heavy fallout over this region. Concentrations of nuclides were almost constant down to about 8 cm sediment depth. Results from calculations by solving the one-dimensional diffusion equation were compared with the measured concentrations of radionuclide. The computed values were much lower than the observed ones, and diffusion alone could not account for the distribution pattern in the sediment. The macrobenthic community was scarce and vertical mixing of pore water could not be explained by bioturbation either. Vertical displacement of the pore water, caused by changes in density of the overlying water column, is a possible mechanism which could explain the rapid penetration of fallout nuclides in the soft bottom sediment. 8 refs, 16 figs, 3 tabs.

8548 (UCRL-ID–117401) **Global ocean circulation and equator-pole heat transport as a function of ocean GCM resolution.** Covey, C. Lawrence Livermore National Lab., CA (United States). Jun 1994. 33p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. Order Number DE95004198. Source: OSTI; NTIS; GPO Dep.

PCMDI Report No. 19.

To determine whether resolution of smaller scales is necessary to simulate large-scale ocean climate correctly, I examine results from a global ocean GCM run with horizontal grid spacings spanning a range from coarse resolutions traditionally used in climate modeling to nearly the highest resolution attained with today's computers. The experiments include four cases employing 4°, 2°, 1° and 1/2° spacing in latitude and longitude, which were run with minimal differences among them, i.e., in a controlled experiment.

Two additional cases-1/2° spacing with a more scale-selective subgridscale mixing of heat and momentum, and approximate 1/4° spacing-are also included. The 1/4° run resolves most of the observed mesoscale eddy energy in the ocean. Several artificial constraints on the model tend to minimize differences among the different resolution cases. Nevertheless, for quantities of interest to global climate studies,the simulations show significant changes as resolution increases.

8549 (VYH-PUB–13) **Contribution of organic acids to the acidity of Finnish lakes.** Kortelainen, P. National Board of Waters and Environment, Helsinki (Finland). 1993. 47p. Order Number DE95737601. Source: OSTI; NTIS.

This study provides a comprehensive assessment of the contribution of organic carbon and organic acids to the acid-base status of Finnish lakes, summarizing empirical organic acidity measurements (from 16 lakes) combined with the Finnish Lake Survey data set (978 lakes sampled in autumn 1987). Due to the random selection of the lakes the high median total organic carbon (TOC = 12 mg l^{-}l) and colour (100 mg l^{-}1 Pt) can be considered representative for small lakes in Finland. Latitude and the proportion of the catchment covered by peatlands were the most important catchment variables determining TOC concentrations in the lakes. Organic carbon in Finnish lakes was dominated by organic acids, averaging about 84 % of DOC (dissolved organic carbon) with smaller amounts of neutral and basic components. In forested, peatland-dominated regions the mean annual leaching of organic acids was calculated to exceed the mean annual deposition of anthropogenic acids. The average total acidity of organic carbon (at pH values existing in natural waters) was 9.7 μeq (mg DOC)$^{-}$1. Each milligram of TOC per liter was estimated to lower Gran alkalinity by about 5 μeq. The median acid-neutralizing capacity provided by organic anions during Gran alkalinity titrations was estimated to be 1.6 μeq (mg TOC)$^{-}$l. Considerable effort was devoted to the development of an empirical model for organic anion, the dissociation product of organic acids, based on fractionations of DOC and titrations of isolated organic acids. Using the Finnish Lake Survey data base the developed model well agreed with the two most widely used methods of estimating organic acidity: 1. the charge balance approach and 2. the model of Oliver et al. (1983)

55 BIOMEDICAL SCIENCES, BASIC STUDIES

8550 (CONF-9307199–Extd.Absts., pp. 11) **The limits to reason what science can know about everyday events.** Casti, J.L. (Technical Univ. of Vienna (Austria)). Telluride Academy, CO (United States). [1993]. From 3. computational molecular biology international workshop; Telluride, CO (United States); 11-25 Jul 1993. In *Open problems of computational molecular biology*. 68p. Order Number DE95000895. Source: OSTI; NTIS; GPO Dep.

The primary goal of science is to offer convincing answers to the question: "Why do we see what we do and not see something else?" In confronting this question, science is distinguished from its many competitors in the reality-generation by the particular sorts of methods and tools the scientist employs. The "scientific" answer is a set of rules, i.e., an algorithm, usually encoded as a mathematical model or computer program, with which one can explain the observed phenomena and predict (sometimes) what will happen next. This talk explores the possible limitations of rule-based procedures for reality generation. In particular, a number of processes from everyday life, ranging from weather and climatic changes to stock market price fluctuations and even to the outbreak of warfare, will be examined in an attempt to determine the degree to which the science of today is in a position to give a convincing set of rules for predicting and/or explaining such phenomena. The lecture concludes with some general ideas centered around the Turing-Church Thesis and the theorems of Goedel and Chaitin for why we can never expect to achieve perfect prediction and explanation – scientific-style – of any natural or human activity.

8551 (CONF-9307199–Extd.Absts., pp. 17-26) **Science is in the eye of the beholder.** Hamming, R.W. Telluride Academy, CO (United States). [1993]. From 3. computational molecular biology international workshop; Telluride, CO (United States); 11-25 Jul 1993. In *Open problems of computational molecular biology*. 68p. Order Number DE95000895. Source: OSTI; NTIS; GPO Dep.

The title is an obvious variant of the standard remark that "Beauty is in the eye of the beholder," and clearly implies that I do not think there is a single scientific method, but rather that there is only some degree of agreement among various practitioners of science. How did I come to this view? That is part of the talk, and by telling you stories about my experiences I hope they will bring you to view the matter somewhat as I do. There is a second reason for the talk. It was obvious to me from the start that I could tell you little of use to you about your own field of specialization. What I could do is emphasize the famous remark of Pasteur, "Luck favors the prepared mind."

5501 Behavioral Biology

Refer also to citation(s) 7573, 8511

5502 Biochemistry

Refer also to citation(s) 8179, 8572, 8577, 8584

8552 (ANL/BIM/PP–78964) **Contribution of ankyrin-band 3 complexes to the organization and mechanical properties of the membrane skeleton of human erythrocyte.** Shen, B.W. (Argonne National Lab., IL (United States). Biological and Medical Research Div.). Argonne National Lab., IL (United States). [1995]. 28p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. Order Number DE95005835. Source: OSTI; NTIS; GPO Dep.

To understand the role of ankyrin-band 3 complexes in the organization of the spectrin-based membrane skeleton and its contribution to the mechanical properties of human erythrocytes, intact skeletons and single-layered skeleton leaflets were prepared from intact and physically sheared membrane ghosts, expanded in low salt buffer, and examined by transmission electron microscopy. While the structures of intact skeletons and single-layered skeleton leaflets shared many common features, including rigid junctional complexes of spectrin, actin, and band 4.1; short stretches (~50 Å) of flexible spectrin filaments; and globular masses of ankyrin-band 3 complexes situated close to the middle of the spectrin filaments, the definition of structural units in the intact skeleton is obscured by the superposition of the two layers. However, the spatial disposition of structural elements can be clearly defined in the images of the single-layered skeleton leaflets. Partially expanded skeletal leaflets contain conglomerates of ankyrin-band 3 complexes arranged in a circular or clove-leaf configuration that straddles multiple strands of thick spectrin cables, presumably reflecting the association of ankyrin-band 3 complexes on neighboring spectrin tetramers as well as the lateral association of the spectrin filaments. Hyperexpansion of the skeleton leaflets led to dissociation of the conglomerates of ankyrin-band 3 complexes, full-extension of the spectrin tetramers, and separation of the individual strands of spectrin tetramers. Clearly defined stands of spectrin tetramers in the hyperexpanded single-layered skeletal leaflets often contained two sets of globular protein masses that divided the spectrin tetramers into three segments of approximately equal length.

8553 (ANL/MCS-TM–200) **Overview of selected molecular biological databases.** Rayl, K.D.; Gaasterland, T. Argonne National Lab., IL (United States). Nov 1994. 92p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31-109-ENG-38. Order Number DE95005906. Source: OSTI; NTIS; GPO Dep.

This paper presents an overview of the purpose, content, and design of a subset of the currently available biological databases, with an emphasis on protein databases. Databases included in this summary are 3D-ALI, Berlin RNA databank, Blocks, DSSP, EMBL Nucleotide Database, EMP, ENZYME, FSSP, GDB, GenBank, HSSP, LiMB, PDB, PIR, PKCDD, ProSite, and SWISS-PROT. The goal is to provide a starting point for researchers who wish to take advantage of the myriad available databases. Rather than providing a complete explanation of each database, we present its

content and form by explaining the details of typical entries. Pointers to more complete "user guides" are included, along with general information on where to search for a new database.

8554 (CONF-9307199–Extd.Absts., pp. 1) **Prediction of protein folding pathways.** Argos, P. (European Molecular Biology Lab., Heidelberg (Germany)). Telluride Academy, CO (United States). [1993]. From 3. computational molecular biology international workshop; Telluride, CO (United States); 11-25 Jul 1993. In *Open problems of computational molecular biology.* 68p. Order Number DE95000895. Source: OSTI; NTIS; GPO Dep.

Recent nuclear magnetic resonance (n.m.r.) hydrogen exchange experiments on five different proteins have delineated the secondary structures formed in trapped, partially folded intermediates. The early forming structural elements are identifiable with a method devised to predict folding pathways. The technique that the sequential selection of structural fragments such as alpha-helices and beta-strands involved in the folding process is founded upon the maximal burial of solvent accessible surface from both the formation of internal structure and substructure association. The substructural elements are defined objectively by major changes in main-chain direction. The predicted folding pathways are in complete correspondence with the n.m.r. results in that the formed structural fragments found in the folding intermediates are those predicted earliest in the pathways. The technique has also been applied to proteins of known tertiary structure and with fold similar to one of the five proteins examined by n.m.r. observations, suggesting conservation of a secondary structural framework or molten globule about which folding nucleates.

8555 (CONF-9307199–Extd.Absts., pp. 1-2) **A new method to configure protein side-chains in homology modelling.** Telluride Academy, CO (United States). [1993]. From 3. computational molecular biology international workshop; Telluride, CO (United States); 11-25 Jul 1993. In *Open problems of computational molecular biology.* 68p. Order Number DE95000895. Source: OSTI; NTIS; GPO Dep.

Protein homology modelling typically involves the prediction of side-chain conformations in the modelled protein while assuming a main-chain trace taken from a known tertiary structure of a protein with homologous sequence. It is generally believed that the need to examine all possible combinations of side-chain confirmations poses the major obstacle to accurate homology modelling. Methods proposed heretofore use only discrete or limited searches of the side-chain torsion angle space to mitigate the combinatorial problem and also rely on simplified energy functions for computational speed. The configurational constraints are typically based upon use of frequently observed torsion angles, fixed steps in torsion angles, or oligopeptide segments taken from tertiary structural databanks that are similar in sequence and conformation with the target structure. A more fundamental approach has been explored for several protein structures and it is demonstrated that the combinatorial barrier in side-chain placement hardly exists. Each side-group can be configured individually in the environment of only the backbone atoms using a systematic search procedure combined with extensive local energy minimization. Tests, using the main-chain or both the main-chain and remaining side-chain atoms to calculate low energy geometries for each residue, establish the dominance of the main-chain contribution. The final structure is achieved by combining the individually placed side-chains followed by a full energy refinement of the structure. The prediction accuracy of this approach has been compared to other automated procedures.

8556 (CONF-9307199–Extd.Absts., pp. 27-34) **Coordinated changes in protein multiple sequence alignments.** Hatrick, K. (National Institute for Medical Research, London (United Kingdom)); Taylor, W.R. Telluride Academy, CO (United States). [1993]. From 3. computational molecular biology international workshop; Telluride, CO (United States); 11-25 Jul 1993. In *Open problems of computational molecular biology.* 68p. Order Number DE95000895. Source: OSTI; NTIS; GPO Dep.

In protein multiple sequence alignments, positions conserved with regard to amino acid type or property are often spotted by eye. In contrast, relationships between pairs of positions (columns) in multiple sequence alignments are best detected by other methods: the term covariance defines one such relationship, where variation as to amino-acid type in one column is echoed by complementary change in amino acid type in the second column. Attempts to this point to answer the following question have not been successful: If the two columns vary in such a manner for all proteins in the multiple alignment and the pattern of covariance is sufficiently complex, is this an indication of proximity of the two residues in the tertiary structure of a member of the protein family? In this paper, new methods for detecting covariance are presented to help solve this problem. 7 refs., 2 figs., 1 tab.

8557 (CONF-9307199–Extd.Absts., pp. 35) **A method to recognize distant repeats in protein sequences.** Heringa, J. (European Molecular Biology Lab., Heidelberg (Germany)); Argos, P. Telluride Academy, CO (United States). [1993]. From 3. computational molecular biology international workshop; Telluride, CO (United States); 11-25 Jul 1993. In *Open problems of computational molecular biology.* 68p. Order Number DE95000895. Source: OSTI; NTIS; GPO Dep.

An automated algorithm is presented that delineates protein sequence fragments which display similarity. The method incorporates a selection of a number of non-overlapping local sequence alignments with the highest similarity scores and a graph-theoretical approach to elucidate the consistent start- and end-points of the fragments comprising one or more ensembles of related subsequences. A multiple alignment of the resulting fragment ensemble(s) is performed. Finally, a profile is constructed from the multiple alignment to detect possible and more distant members within the sequence. The method tolerates mutations in the repeats as well as insertions and deletions. The sequence spans between the various repeats or repeat clusters may be of different lengths. The technique will be shown using a number of proteins where the repeating fragments are known based on information additional to the protein sequences.

8558 (CONF-9307199–Extd.Absts., pp. 38-40) **Determination of architectural elements of RNA structure.** Konings, D.A.M.; Gutell, R.A. Telluride Academy, CO (United States). [1993]. From 3. computational molecular biology international workshop; Telluride, CO (United States); 11-25 Jul 1993. In *Open problems of computational molecular biology.* 68p. Order Number DE95000895. Source: OSTI; NTIS; GPO Dep.

RNA structure has been elucidated by a variety of computational and experimental methods. Comparative sequence analysis, as one of these methods, deduces a common secondary structure for RNAs belonging to a set of homologous sequences through correlation analysis based on a multiple sequence alignment. This method is responsible for the derivation of many higher-order structure models including tRNAs and 16S and 23S rRNAs. Underlying the complex architecture of these RNA structures is a repertoire of simpler structural elements. An understanding of these simple structural elements is needed to appreciate fully RNA structural and functional diversity. In addition, this knowledge is essential to further improve the accuracy of predicting RNA secondary structure from a single sequence based on thermodynamic or kinetic based principles. Starting from these complex higher-order structures as derived by comparative sequence analysis, we aim to identify their underlying structural constraints which will consist of simpler structural (and associated sequence) motifs. An example of such a structural motif are the specific sequence constraints that are associated with hairpin "tetraloops" in rRNA.

8559 (CONF-9307199–Extd.Absts., pp. 41-44) **Computational molecular biology in logical perspective.** Konopka, A.K. Telluride Academy, CO (United States). [1993]. From 3. computational molecular biology international workshop; Telluride, CO (United States); 11-25 Jul 1993. In *Open problems of computational molecular biology.* 68p. Order Number DE95000895. Source: OSTI; NTIS; GPO Dep.

Particularly in Biology heuristic reasoning can be conclusive. Yet biologists face the problem of not being able to specify all the rules applied to derive conclusions. Nor are they able to list all assumptions on which those rules ought to operate. It seems that these inabilities are a reflection of the complexity of biological systems themselves. Biological phenomena are often represented by models that are still too complex to be described in a communicable

manner. Further and further modeling is required until our observations can be conveyed in a linguistically comprehensive way. The cascade of models gives us the advantage of creating "communicable reality" but does not help us to judge the evidence pertinent to "real" (i.e., not necessarily communicable) reality. To the contrary, the more advanced a model in a cascade is, the further is its "distance" (in terms of number of modeling steps) from the modeled system. The presentation focus on the protocols of pragmatic inference as seen, but not always clearly described, by most computational biologists. A general scheme of pragmatic inference for sequence research is presented. 8 refs.

8560 (CONF-9307199–Extd.Absts., pp. 45-50) **Toward the unification of sequence and structural data for identification of structural and functional constraints.** Lawrence, C. (Wadsworth Labs., Albany, NY (United States)). Telluride Academy, CO (United States). [1993]. From 3. computational molecular biology international workshop; Telluride, CO (United States); 11-25 Jul 1993. In *Open problems of computational molecular biology.* 68p. Order Number DE95000895. Source: OSTI; NTIS; GPO Dep.

The identification and characterization of local residue patterns or conserved segments shared a set of biopolymers has provided a number of insights in molecular biology. Biopolymer sequences are observations from macro molecules that share common structural or functional features. The approach taken here rests on the notion that information may be most efficiently extracted from these observations through the use of a model that faithfully represents macro-molecular characteristics. Accordingly, our efforts are focused on statistical models which attempt to capture what we believe to be central features of protein structure, function, and change. 17 refs.

8561 (CONF-9307199–Extd.Absts., pp. 51-53) **Evolution on rugged landscapes.** Macken, C. (Los Alamos National Lab., NM (United States)). Telluride Academy, CO (United States). [1993]. From 3. computational molecular biology international workshop; Telluride, CO (United States); 11-25 Jul 1993. In *Open problems of computational molecular biology.* 68p. Order Number DE95000895. Source: OSTI; NTIS; GPO Dep.

We have studied walking on rugged fitness landscape as a model of the process of affinity maturation in an immune response. Affinity maturation appears to be the outcome of a mutation and selection process, described as "neo-Darwinist evolution in real time." Divorced from the biological context, walking on a fitness landscape applies to the appearance of a general optimization process. Here, we outline a model of affinity maturation in order to introduce the formalism of fitness landscapes, and to develop an intuition about optimization in high dimensional space. Then we discuss more general issues, such as comparison of optimization techniques, and classification of landscapes. 1 ref.

8562 (CONF-9307199–Extd.Absts., pp. 54-58) **Just-in-time information forwarding: Biological systems viewed as Shannonian Communication Systems.** Modena, S.A. (North Carolina State Univ., Raleigh, NC (United States)). Telluride Academy, CO (United States). [1993]. From 3. computational molecular biology international workshop; Telluride, CO (United States); 11-25 Jul 1993. In *Open problems of computational molecular biology.* 68p. Order Number DE95000895. Source: OSTI; NTIS; GPO Dep.

Molecular biology today seems to follow the Latin model: the central dogma is presented as the first declension, regular in structure but not highly used. Subsequent declensions are introduced as the powerful main stays of cellular life at the molecular level. The final declination is a catch all for the exceptions. I propose a successor model: Just in Time Information Forwarding. It will emphasize information, time cynamics, and noise; be scalable; be able to represent a biological work engine requiring energy dissipation, and most importantly, not be expressed explicity in terms of specific cellular elements. The 'Just-In-Time Information Forwarding Model' is based on the Shannon General Communication System, as set forth by Shannon with the specific augmentation by Rothstein, along with the addition of two heuristics needed for a genetics-driven biological system. 9 refs.

8563 (CONF-9307199–Extd.Absts., pp. 59-60) **Towards DNA sequencing by hybridization.** Peuzner, P.A. (Pennsylvania State Univ., University Park, PA (United States)). Telluride Academy, CO (United States). [1993]. From 3. computational molecular biology international workshop; Telluride, CO (United States); 11-25 Jul 1993. In *Open problems of computational molecular biology.* 68p. Order Number DE95000895. Source: OSTI; NTIS; GPO Dep.

In view of the limitations of current DNA sequencing technology, it would be advantageous to have a method for sequencing DNA that (1) does not require gel electrophoretic separation, (2) provides the sequence of a very long DNA fragments in a single experiment, (3) is amenable to automation. Sequencing by hybridization (SBH) is a challenging alternative to the classical DNA sequencing methods. The basic approach is to build n array (Sequencing Chip) of short oligonucleotides, to use hybridization for finding oligonucleotide content of an unknown DNA fragment and to reconstruct the original fragment by a combinatorial algorithm.

8564 (CONF-9307199–Extd.Absts., pp. 61-62) **On the Schroedinger question.** Rosen, R. Telluride Academy, CO (United States). [1993]. From 3. computational molecular biology international workshop; Telluride, CO (United States); 11-25 Jul 1993. In *Open problems of computational molecular biology.* 68p. Order Number DE95000895. Source: OSTI; NTIS; GPO Dep.

Almost fifty years ago, the eminent physicist Erwin Schroedinger published a famous essay, entitled "What is Life?". We undertake a comprehensive re-evaluation of this basic question, both as Schroedinger himself envisioned it, and in the light of a half-century of further experience since his time, not only in biology, but also in physics, in mathematics, and in the theory of systems. Today, Schroedinger's Essay has long since been embalmed as a classic embodiment of molecular-biological orthodoxy. We assert that, to the contrary, Schroedinger's arguments were then, and remain today, highly heterodox; indeed, quite incompatible with the dogmas which have evolved since then. We will attempt to reformulate these original arguments, and compare them to the distorted and truncated versions which have survived in the molecular biology of today.

8565 (CONF-9307199–Extd.Absts., pp. 63) **Biopolymer sequences and structures.** Schuster, P. (Institut fur Molekulare Biotechnologie, Jena (Germany)). Telluride Academy, CO (United States). [1993]. From 3. computational molecular biology international workshop; Telluride, CO (United States); 11-25 Jul 1993. In *Open problems of computational molecular biology.* 68p. Order Number DE95000895. Source: OSTI; NTIS; GPO Dep.

Properties and functions of biopolymers are considered as being the result of two classes of mappings. The first class consists of maps which assign a (three-dimensional) structure to every sequence. They are tantamount to mappings from genotypes into phenotypes. The second class of mappings deal with relations between structures and functions as expressed by free energies, activation energies, or other scalar quantities. They map structures into the real numbers. A landscape is understood as a combination of one map of each of the two classes. We thus have, for example, free energy landscapes, activation energy landscapes, fitness landscapes, etc.

8566 (CONF-9307199–Extd.Absts., pp. 64) **Evolution on fitness landscapes.** Stadler, P.F. (Universitat Wien, Vienna (Austria)). Telluride Academy, CO (United States). [1993]. From 3. computational molecular biology international workshop; Telluride, CO (United States); 11-25 Jul 1993. In *Open problems of computational molecular biology.* 68p. Order Number DE95000895. Source: OSTI; NTIS; GPO Dep.

Evolution can be viewed as an adaptation process on a "fitness" landscapes (at least in some systems). The dynamics of evolution are hence tightly linked to the structure of the underlying landscape. Global features of landscapes can be described by statistical measures like number of optima, lengths of walks, and correlation functions. Statistical characteristics of RNA landscapes are accessible on the level of secondary structures. It turns out that RNA landscapes belong to the same class as well known optimization problems and simple spin glass models. The evolution of a quasispecies on such landscapes exhibits three dynamical regimes depending on the replication fidelity: Above the localization threshold the population is centered around a (local) optimum, between localization and "dispersion threshold" the population is

still centered around a consensus sequence, which, however, is non constant in time. For very large mutation rate the population spreads gas-like in sequence space.

8567 (CONF-9307199–Extd.Absts., pp. 65-68) **Nonalignability and noncompactness models and reality of low-complexity protein segments.** Wootton, J.C. (National Institutes of Health, Bethesda, MD (United States)). Telluride Academy, CO (United States). [1993]. From 3. computational molecular biology international workshop; Telluride, CO (United States); 11-25 Jul 1993. In *Open problems of computational molecular biology*. 68p. Order Number DE95000895. Source: OSTI; NTIS; GPO Dep.

How much of amino acid sequence space is represented in natural proteins? Global computational analyses of sequence databases have recently shown surprising biases. More than half of deduced protein sequences contain at least one segment of low compositional complexity, consisting predominantly of one or a few amino acids, and such strongly biassed, interspersed segments comprise 15% of the residues in the database. Conserved sequence families, of the type common to a wide range of organisms and familiar since the 1950s from sequence alignments, may number fewer than 1000 according to some estimated extrapolations, and such conserved domains and motifs may eventually account for less than half of the residues in natural proteins. Moreover, from a rapidly growing number of cases of random cDNA or genomic coding DNA sequenced without regard for function, deduced amino acid sequences show a non-random excess of long "medium-complexity" sequences in addition to the near-homopolymeric low-complexity segments.

8568 (DOE/ER/13426–T4) **Structural studies of complex carbohydrates of plant cell walls. Progress report, June 15, 1992–June 14, 1993.** Darvill, A.G. Georgia Univ., Athens, GA (United States). Complex Carbohydrate Research Center. Oct 1994. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG09-85ER13426. Order Number DE95005545. Source: OSTI; NTIS; GPO Dep.

This report contains the abstracts of fourteen papers published, in press, or in preparation reporting on research activities to investigate the structure, as well as the function of cell walls in plants. This document also contains research on methods to determine the structure of complex carbohydrates of the cell walls.

8569 (DOE/ER/60490–T5) **The development of a generic model for assessing the effects of elevated CO_2 on ecosystems. Progress report, September 1, 1987–May 31, 1988.** Reynolds, J.F.; Dougherty, R.L.; Harley, P.C.; Hilbert, D.W.; Skiles, J.W. San Diego State Univ., CA (United States). [1988]. 36p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG03-86ER60490. Order Number DE95002128. Source: OSTI; NTIS; GPO Dep.

Nitrogen concentrations in leaves vary in response to resource availability, generally increasing with increasing light or soil nitrogen and decreasing when plants are grown at higher than ambient carbon dioxide concentrations. This decrease in leaf nitrogen which commonly occurs at elevated levels of carbon dioxide Is intriguing and important for a number of reasons. Since leaf nitrogen and photosynthetic capacity are correlated, plants grown at high levels of carbon dioxide often do not display remarkable increases in growth and productivity. This study asks: (1) Is decreased leaf nitrogen in plants grown at elevated carbon dioxide levels an adaptive response of plants? and (2) Is this response predictable and consistent with responses to light and nutrition?

8570 (DOE/ER/60490–T6) **[Generic ecosystem model for assessing the effects of elevated carbon dioxide on ecosystems]. [Annual] report, July 1, 1988–June 30, 1989.** Reynolds, J.F. San Diego State Univ., CA (United States). [1989]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG03-86ER60490. Order Number DE95002129. Source: OSTI; NTIS; GPO Dep.

Development of simulation models of the effects of elevated CO_2 on plant physiological processes requires close cooperation between modelers and experimentalists. In particular, the detailed process-based, leaf-level photosynthesis model currently in development at San Diego State University requires parameterization data for different plant species, levels within the canopy, and growth conditions. Validation of model predictions will require additional data. The purpose of this supplemental is to initiate ways in which different groups involved in elevated CO_2 research can interact to advance the goals of both the individual research scientists and the CO_2 Research Program.

5503 Cytology

8571 (CONF-9307199–Extd.Absts., pp. 3-8) **Surface contraction and expansion waves correlated with differentiation in axolotl embryos. III. The shape of the fate map.** Bjoerklund, N.K. (Univ. of Manitoba, Winnipeg (Canada)); Gordon, R. Telluride Academy, CO (United States). [1993]. From 3. computational molecular biology international workshop; Telluride, CO (United States); 11-25 Jul 1993. In *Open problems of computational molecular biology*. 68p. Order Number DE95000895. Source: OSTI; NTIS; GPO Dep.

Why do some types of cancer cells occur when a cellular switch is somehow inappropriately stuck? If you cut off a salamander's leg, it simply grows a new leg. How does it do this? Why don't our own cells retain this ability? Why should gene expression in a cell culture sometimes change with generation number? We think that the answer to each of these questions might be found in a complete understanding of normal embryonic development. If we could explain precisely how a single egg can become a multicellular organism we could then use this knowledge to understand many other related cellular processes. The discipline of embryology has hitherto been to a large degree unsuccessful in achieving this understanding. Embryologists still cannot explain how a cell "knows" that it is to become a certain type of cell at a certain time and in a certain place. We have recently made a discovery that may provide the long missing spatial component of embryological explanation, and turn this situation around. 9 refs.

5504 Genetics

Refer also to citation(s) 7112, 7113, 7114

8572 (ANL/CMB/PP–84252) **Use of labeled primers for differential display.** Paunesku, T.; Woloschak, G.E. Argonne National Lab., IL (United States). [1995]. 15p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. Order Number DE95004642. Source: OSTI; NTIS; GPO Dep.

Two artifacts introduced in using differential display technology are (1) random priming from dT present from affinity purification of PolyA+ RNA and (2) hybridization of the arbitrary primer to template target sequences on both cDNA strands. We have developed a method eliminating both problems. By separately using 5'-end-labeled $(T)_{12}XY$ and arbitrary primers to label bands and comparing two differential display patterns, we can detect only those products incorporating the $(T)_{12}XY$ primer on the 3' ends and the arbitrary primer on 5' ends. Those bands that are generated randomly in the PCR are readily detectable and can be ignored.

8573 (CONF-9304276–Summ.) **Report on the Second International Workshop on Human Chromosome 9.** Kwiatkowski, D.J. (Brigham and Women's Hospital, Boston, MA (United States)); Armour, J.; Bale, A.E. Brigham and Women's Hospital, Boston, MA (United States). [1993]. 10p. Sponsored by USDOE, Washington, DC (United States);Department of Health and Human Services, Washington, DC (United States). DOE Contract FG02-93ER61576. From 2. international workshop on Chromosome 9; Chatham, MA (United States); 18-20 Apr 1993. Order Number DE95004183. Source: OSTI; NTIS; GPO Dep.

The Second International Workshop on Human Chromosome 9 was held in Chatham, Massachusetts on April 18–20, 1993. Fifty-three abstracts were received and the data presented on posters. The purpose of the meeting was to bring together all interested investigators working on the map of chromosome 9, many of whom had disease-specific interests. After a brief presentation of interests and highlighted results, the meeting broke up into the following subgroups for production of consensus maps: 9p; 9cen-q32; 9q32 ter. A global mapping group also met. Reports of each of these working groups is presented in the summary.

8574 (CONF-9307199–Extd.Absts., pp. 9-10) **Deriving non-homogeneous Markov chain models from the multiple alignment with the entropy criteria.** Borodovsky, M. (Georgia Institute of Technology, Atlanta, GA (United States)). Telluride Academy, CO (United States). [1993]. From 3. computational molecular biology international workshop; Telluride, CO (United States); 11-25 Jul 1993. In *Open problems of computational molecular biology*. 68p. Order Number DE95000895. Source: OSTI; NTIS; GPO Dep.

Many biologically significant regions of the DNA (and protein) sequences do not reveal any consensus-like pattern which would be determined by the traditional multiple alignment algorithm based on matching scores. The important example of that kind would be the DNA protein-coding regions for which the attempt of the multiple alignment might be successful only in the case of collecting a narrow group of closely related genes. The general idea to perform multiple alignment for several randomly chosen gene sequences looks unreasonable. Nonetheless, when it is placed into a bit different context this idea leads to the extracting a non-homogeneous Markov chain model of the protein-coding sequence. This model might be considered as a generalization of the consensus or profile-like model of the DNA functional region. We suggest a multiple alignment method for deriving the parameters of the non-homogeneous Markov chain model from the sample of sequences which are suspected to share common compositional pattern and which can be described by virtue of that model. Usually such a pattern might be expected if there is a priori known phasing of the biologically active DNA (like triplet genetic code), positioning around the firmly established single point (like origin of replication or transcription) and soon. 3 refs.

8575 (CONF-9307199–Extd.Absts., pp. 12-16) **Estimation of protein coding density in a corpus of DNA sequence data.** Fickett, J.W. (Los Alamos National Lab., NM (United States)); Guigo, R. Telluride Academy, CO (United States). [1993]. From 3. computational molecular biology international workshop; Telluride, CO (United States); 11-25 Jul 1993. In *Open problems of computational molecular biology*. 68p. Order Number DE95000895. Source: OSTI; NTIS; GPO Dep.

A number of experimental methods have been reported for estimating the number of genes in a genome, or the closely related coding density of a genome, defined as the fraction of base pairs in codons. Recently, DNA sequence data representative of the genome as a whole have become available for several organisms, making the problem of estimating coding density amenable to sequence analytic methods. Estimates of coding density for a single genome vary widely, so that methods with characterized error bounds have become increasingly desirable. We will present a method to estimate the protein coding density in a corpus of DNA sequence data, in which a "coding statistic" is calculated for a large number of windows of the sequence under study, and the distribution of the statistic is decomposed into two normal distributions, assumed to be the distributions of the coding statistic in the coding and noncoding fractions of the sequence windows. The accuracy of the method is evaluated using known data and application is made to the yeast chromosome III sequence and to C. Elegans cosmid sequences. It can also be applied to fragmentary data, for example a collection of short sequences determined in the course of STS mapping. 10 refs.

8576 (CONF-9307199–Extd.Absts., pp. 36-37) **Physical mapping in the presence of errors: The chimeric clones problem.** Greenberg, D.S. (Sandia National Labs., Albuquerque, NM (United States)); Istrail, S.; Sipser, M. Telluride Academy, CO (United States). [1993]. DOE Contract AC04-76DP00789. From 3. computational molecular biology international workshop; Telluride, CO (United States); 11-25 Jul 1993. In *Open problems of computational molecular biology*. 68p. Order Number DE95000895. Source: OSTI; NTIS; GPO Dep.

An important problem for the Human Genome Project is to develop robust software technology for the physical mapping of chromosomes. The process of creating a physical map is the divide/merge step in a divide-and-conquer approach to sequencing DNA and related problems. One large segment of DNA is reduced to several smaller pieces by physically breaking it apart. The process of breaking into pieces does not preserve information about the order of the pieces in the whole and thus a combinatorial problem results to reorder the pieces. Various experimental errors complicate the problem. A major source of difficulty – which seems to be inherent to the recombination technology – is the presence of "chimeric" DNA clones. It is fairly common for two disjoint DNA pieces to form a chimera, i.e., a fusion of two pieces which appears as a single piece.

8577 (CONF-9310397–Summ.) **Human Genome News: Workshop on sequencing by hybridization.** Houston Advanced Research Center, The Woodlands, TX (United States). Jan 1994. 3p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG03-93ER61725. From 2. international workshop on sequencing by hybridization (SBH); The Woodlands, TX (United States); 28-30 Oct 1993. Order Number DE95004182. Source: OSTI; NTIS; GPO Dep.

A brief description of the Second International Workshop on Sequencing by Hybridization as held in Woodlands, Texas October 28–30, 1993 is provided in this report. Highlights of sessions entitled Chemistry and Analogs, Engineering and Automation, Hybridization Data and Theory and Informatics are given.

8578 (DOE/ER–0591-Suppl.) **ELSI Bibliography: Ethical, legal and social implications of the Human Genome Project. 1994 Supplement.** Yesley, M.S.; Ossorio, P.N. (comps.). USDOE Office of Energy Research, Washington, DC (United States). 1 Sep 1994. 88p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95006365. Source: OSTI; NTIS; GPO Dep.

This report updates and expands the second edition of the ELSI Bibliography, published in 1993. The Bibliography and Supplement provides a comprehensive resource for identifying publications on the major topics related to the ethical, legal and social issues (ELSI) of the Human Genome Project. The Bibliography and Supplement are extracted from a database compiled at Los Alamos National Laboratory with the support of the Office of Energy Research, US Department of Energy. The second edition of the ELSI Bibliography was dated May 1993 but included publications added to the database until fall 1993. This Supplement reflects approximately 1,000 entries added to the database during the past year, bringing the total to approximately 7,000 entries. More than half of the new entries were published in the last year, and the remainder are earlier publications not previously included in the database. Most of the new entries were published in the academic and professional literature. The remainder are press reports from newspapers of record and scientific journals. The topical listing of the second edition has been followed in the Supplement, with a few changes. The topics of Cystic Fibrosis, Huntington's Disease, and Sickle Cell Anemia have been combined in a single topic, Disorders. Also, all the entries published in the past year are included in a new topic, Publications: September 1993–September 1994, which provides a comprehensive view of recent reporting and commentary on the science and ELSI of genetics.

8579 (DOE/ER/13621–T1) **Molecular characterization of a maize regulatory gene. Progress report, July 1989–March 1990.** Wessler, S. Georgia Univ., Athens, GA (United States). Research Foundation. [1990]. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG09-86ER13621. Order Number DE95005785. Source: OSTI; NTIS; GPO Dep.

This progress report contains information concerning the characterization of the Maize regulatory gene. The findings of this research program have immediate significance. Firstly, it provides support for the notion that R proteins, produced by the regulatory gene, are functionally equivalent. Secondly, the success of these experiments provides a simple transient assay for either natural or constructed R protein mutations. The relative ease of this assay coupled with overnight results are important prerequisites to the proposed experiments involving a structure-function analysis of the R protein.

8580 (DOE/ER/13621–T2) **Molecular characterization of a maize regulatory gene. Final Progress report, November 1989–March 14, 1994.** Wessler, S. Georgia Univ., Athens, GA (United States). Research Foundation. [1994]. 23p. Sponsored by USDOE,

Washington, DC (United States);National Science Foundation, Washington, DC (United States);Department of Health and Human Services, Washington, DC (United States);Rockefeller Foundation, New York, NY (United States). DOE Contract FG09-86ER13621. Order Number DE95005741. Source: OSTI; NTIS; GPO Dep.

This final report summarizes the progress made on the molecular characterization of maize regulatory gene. This program has studied: the R protein produced by this gene; the plant transcription of activator; upstream repression of the expression of the gene; specific alleles; splicing of a R homolog in rice; and how overexpression of R alters plant development.

8581 (DOE/ER/61137–T3) **Improvement and automation of ligation-mediated genomic sequencing. Final report.** City of Hope Beckman Research Inst., Duarte, CA (United States). [1994]. 2p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG03-91ER61137. Order Number DE95005808. Source: OSTI; NTIS; GPO Dep.

The specific aim of this project was to improve, simplify, and/or automate all steps of the ligation-mediated genomic sequencing (LMGS) procedure. We were able to partially explain the failure of some oligonucleotides as due to previously unknown repetitive sequences. A novel computer study of repetitive sequences was done which led to the determination of several new consensus sequences for various repetitive elements, improving our understanding of repetitive sequence evolution and also leading to a compilation of consensus sequences.

8582 (DOE/ER/61400–T1) **[Cloning-idependent mapping technology for genomic fidelity, contig linking, C-DNA site analysis, and gene detection]. Final report.** Lerman, L.S. Massachusetts Inst. of Tech., Cambridge, MA (United States). 25 Dec 1994. 3p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-92ER61400. Order Number DE95005812. Source: OSTI; NTIS; GPO Dep.

The project was designed to develop and apply a novel unconventional approach to genome mapping based on physical properties of DNA that are a sensitive function of the base sequence, and so does not depend on the clonability of the sequences to be mapped nor on the presence of particular restriction sites. We have shown that a broad array of DNA fragments are retarded at nearly the same level in denaturing gradient gel electrophoresis (DGGE) if the segment with the lowest thermal stability has the same melting temperature, regardless of the length of the fragment. The retarded pattern remain steady in the gel, changing little with continued field exposure. Mapping proceeds by the analysis of two-dimensional patterns produced by random fragmentation of genomic DNA and denaturing gradient gel electrophoresis. Random fragments are first separated according to length by conventional agarose electrophoresis. The result is a two- dimensional pattern which can be idealized as an array of nearly parallel, mostly separated lines of DNA. The pattern is blotted onto a membrane and probed sequentially with oligos or relevant DNA or RNA fragments. The endpoints on the fragment length scale of each line hybridizing with each probe, the distribution along each line, and the depth in the gradient constitute specific map information.

8583 (DOE/ER/61670–1) **Workshop on identification of transcribed sequences. Final report, August 15, 1993–August 14, 1994.** Gardiner, K. Eleanor Roosevelt Inst., Denver, CO (United States). Nov 1993. 63p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG03-93ER61670. (CONF-9310297–Absts.: 3. international workshop on the identification of transcribed sequences, New Orleans, LA (United States), 2-4 Oct 1993). Order Number DE95004445. Source: OSTI; NTIS; INIS; GPO Dep.

This report contains abstracts of individual papers presented at the Workshop on Identification of Transcribed Sequences held in New Orleans, Louisiana October 2–4, 1993.

8584 (LA-UR–94-3466) **Molecular architecture of classical cytological landmarks: Centromeres and telomeres.** Meyne, J. Los Alamos National Lab., NM (United States). [1994]. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9403172–1: US-Japan joint seminar on classical and molecular cytogenetic analysis of cereal genomes, Manhattan, KS (United States), Mar 1994). Order Number DE95002710. Source: OSTI; NTIS; GPO Dep.

Both the human telomere repeat and the pericentromeric repeat sequence (GGAAT)n were isolated based on evolutionary conservation. Their isolation was based on the premise that chromosomal features as structurally and functionally important as telomeres and centromeres should be highly conserved. Both sequences were isolated by high stringency screening of a human repetitive DNA library with rodent repetitive DNA. The pHuR library (plasmid Human Repeat) used for this project was enriched for repetitive DNA by using a modification of the standard DNA library preparation method. Usually DNA for a library is cut with restriction enzymes, packaged, infected, and the library is screened. A problem with this approach is that many tandem repeats don't have any (or many) common restriction sites. Therefore, many of the repeat sequences will not be represented in the library because they are not restricted to a viable length for the vector used. To prepare the pHuR library, human DNA was mechanically sheared to a small size. These relatively short DNA fragments were denatured and then renatured to C_ot 50. Theoretically only repetitive DNA sequences should renature under C_ot 50 conditions. The single-stranded regions were digested using S1 nuclease, leaving the double-stranded, renatured repeat sequences.

5505 Metabolism

8585 (BNL–61079) **The photosynthetic acclimation of Lolium perenne growing in a free-air CO_2 enrichment (FACE) system.** Bryant, J.B. (Univ. of Essex, Colchester (United Kingdom)). Brookhaven National Lab., Upton, NY (United States). Nov 1994. 31p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. Order Number DE95004954. Source: OSTI; NTIS; GPO Dep.

Thesis submitted to Univ. of Essex, Colchester (United Kingdom) and Writtle Coll. (United Kingdom).

Stands of Ryegrass (Lolium perenne L. cv. Bastion) were grown in the field at ambient or elevated (600μmol/mol) CO_2 concentration, high (560Kg/ha) or low (140Kg/ha) nitrogen addition and with a frequent (every 4 weeks) or infrequent (every 8 weeks) cutting regime. Plants were in the second year of a 3 year experiment. Exposure to elevated CO_2 was carried out with a Free-Air CO_2 Enrichment (FACE) system which provides the most 'realistic' system of CO_2 fumigation currently available. Elevated CO_2 increased diurnal CO_2 assimilation by between 34 and 88% whilst reducing rates of stomatal conductance by between 1 and 42%. However, analysis of the A vs. Ci response showed considerable acclimation of the photosynthetic apparatus in response to elevated CO_2 - Vc_{max} as an in vivo measure of RubisCO activity, decreased by between 29 and 35% in high CO_2, whilst J_{max}, as a measure of the RubP regeneration capacity, showed no significant change. Two out of three additional perennial grassland species studied showed similar acclamatory behavior to Ryegrass. Diurnal assimilation rate, J_{max} and, in most cases, Vc_{max}, increased significantly directly after cutting of Ryegrass stands, but nitrogen treatment had little effect on any of these parameters. Neither stomatal density, stomatal index nor stomatal pore length of Ryegrass were significantly altered by growth in elevated CO_2. The results are discussed in terms of the limitation imposed on maximizing photosynthetic and growth responses of Ryegrass at elevated CO_2, by the ability of perennial species to increase long-term sink capacity under these conditions.

8586 (DOE/ER/61032–T2) **Controls over nutrient flow through plants and microbes in Arctic tundra. Final technical report.** Chapin, F.S. III. California Univ., Berkeley, CA (United States). [1995]. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG03-90ER61032. Order Number DE95004449. Source: OSTI; NTIS; INIS; GPO Dep.

We successfully developed a series of models to explore the importance of species differences in phenologies of growth and nitrogen uptake to competitive interactions in upland tussock tundra. We developed growth models for 4 major tussock tundra species, based on observed growth rates and phenologies. We found that differences in phenology and nutrient use strategy could permit coexistence of some, but not all of the tundra plants modeled. The plant that was the best competitor, because of its rapid growth rate

and superior ability to retranslocate nitrogen, may be naturally limited in its competitive ability by its tussock growth form. The mechanisms behind this limitation, and the contributions of patterns of mortality to observed production, will be explored in future modeling and experimental studies. In addition, our models point out that our understanding of the dynamics of nitrogen supply is still inadequate.

5506 Medicine

Refer also to citation(s) 8283, 8394

8587 (IA–1486, pp. 116-117) **^{99m}Tc-Teboroxime as an alternative to ^{201}Thalium for myocardial perfusion imaging. Preliminary study.** Weininger, J.; Friemark, D.; Guetta, V.; Chouraqui, P. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993*. 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. CARDIOVASCULAR DISEASES/ biomedical radiography; CHEMICAL PREPARATION; COMPARATIVE EVALUATIONS; GAMMA CAMERAS; LABELLED COMPOUNDS; MYOCARDIUM; OXIMES; PERFUSED ORGANS; RADIOPHARMACEUTICALS; SOREQ NUCLEAR RESEARCH CENTER; TECHNETIUM 99; THALLIUM 201; UPTAKE

8588 (IA–1486, pp. 145-146) **Industrial x-ray computed tomography.** Baran, A.; Polak, E.; Tzabarim, M.; Goresnic, C.; Iszak, E.; Rapaport, M.S.; Gayer, A. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993*. 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. INDUSTRIAL RADIOGRAPHY/image processing; BGO DETECTORS; CADMIUM TUNGSTATES; CESIUM 137; COMPUTERIZED TOMOGRAPHY; COUNTING CIRCUITS; ELECTRIC CONDUCTIVITY; GAMMA RADIOGRAPHY; GAMMA SOURCES; PHOTON TRANSMISSION SCANNING; PHOTOSENSITIVITY; PULSE CIRCUITS; PULSE TECHNIQUES; RESOLUTION; X-RAY RADIOGRAPHY

8589 (IAEA-R–6328-F) **Monoclonal antibody (SZ-51) specific for activated platelets is useful in the diagnosis of thrombosis. Final report for the period December 1990 - April 1994.** Ruan Chenggeng (Suzhou Medical College, Suzhou (China). Jiangsu Inst. of Hematology). International Atomic Energy Agency, Vienna (Austria). Aug 1994. 3p. Order Number DE95615746. Source: OSTI; NTIS (US Sales Only); INIS.

Non invasive detection and localisation of thrombogenesis in various clinical disorders remains a challenge. Mr. C. Ruan and his co-workers from the Jiangsu Institute of Hematology, Thrombosis and Hemostasis Research Unit, Suzhon Medical College, Suzhon, China, had successfully developed the entire steps from the production, purification and radiolabelling of a monoclonal antibody to an alpha granule protein expressed on the surface of activated platelets, to the validation of its immunoreactivity with activated platelets in few clinical disorders characterised by injury to platelets. Further, they have labelled this monoclonal antibody with 99mTc and demonstrated in vivo localisation of thrombogenic foli by an experimental model in dogs using immunoscintigraphic techniques. Biodistribution studies had clearly shown significant labelled antibody accumulation in thrombogenic foli compared to the surrounding blood and soft tissue background. Radiolabelled monoclonal antibody scintigraphy is thus shown to have potential in achieving the hitherto elusive goal of non invasive localisation of thrombogenesis in clinical practice.

8590 (KAERI/RR–1318/93) **Development of technology for biological dosimetry -A study on the radiation and environmental safety-.** Lee, Kang Suk (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Cheon, Ki Jeong; Kim, Kook Chan; Kim, Jin Kyu; Kim, Sang Bok; Kim, In Kyu; Park, Hyo Kook. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jul 1994. 85p. (In Korean). Order Number DE95612629. Source: OSTI; NTIS; INIS.

α-amylase showed a significant increase in its activity when exposed to radiation of 0.1 Gy. However it had no relationship with radiation dose. Enzyme activities in liver tissue showed similar changes to those in serum. Among others, changes in acid phosphatase activity were highly related to radiation dose. Of acute phase proteins in serum, CRP, ceruloplasmin and haptoglobin positively responded to radiation while albumin did negatively. ELISA proved to be an efficient method to detect changes in serum protein level. Finally the measurements of changes in APRs using ELISA could provide an useful tools for biological dosimetry. (Author).

8591 (LBL-PUB–3095-Rev.1) **Medical and biohazardous waste generator's guide: Revision 1.** Lawrence Berkeley Lab., CA (United States). Sep 1994. 58p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00098. Order Number DE95004674. Source: OSTI; NTIS; INIS; GPO Dep.

This Guide describes the procedures required to comply with all federal and state laws and regulations and Lawrence Berkeley Laboratory (LBL) policy applicable to medical and biohazardous waste. The members of the LBL Biological Safety Subcommittee participated in writing these policies and procedures. The procedures and policies in this Guide apply to LBL personnel who work with infectious agents or potentially infectious agents, publicly perceived infectious items or materials (e.g., medical gloves, culture dishes), and sharps (e.g., needles, syringes, razor blades). If medical or biohazardous waste is contaminated or mixed with a hazardous chemical or material, with a radioactive material, or with both, the waste will be handled in accordance with the applicable federal and State of California laws and regulations for hazardous, radioactive, or mixed waste.

8592 **Fluorescent image tracking velocimeter.** Shaffer, F.D. 1992. Filed date 24 Nov 1992. U.S. Patent Application 7-980,894. 34p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95006124. Source: OSTI; NTIS (US Sales Only); GPO Dep.

This invention is comprised of a multiple-exposure fluorescent image tracking velocimeter (FITV) which detects and measures the motion (trajectory, direction and velocity) of small particles close to light scattering surfaces. The small particles may follow the motion of a carrier medium such as a liquid, gas or multi-phase mixture, allowing the motion of the carrier medium to be observed, measured and recorded. The main components of the FITV include: (1) fluorescent particles; (2) a pulsed fluorescent excitation laser source; (3) an imaging camera; and (4) an image analyzer. FITV uses fluorescing particles excited by visible laser light to enhance particle image detectability near light scattering surfaces. The excitation laser light is filtered out before reaching the imaging camera allowing the fluoresced wavelengths emitted by the particles to be detected and recorded by the camera. FITV employs multiple exposures of a single camera image by pulsing the excitation laser light for producing a series of images of each particle along its trajectory. The time-lapsed image may be used to determine trajectory and velocity and the exposures may be coded to derive directional information.

8593 (PNL-SA–25339) **Real-time dosimetry for boron-neutron capture therapy.** Bliss, M.; Craig, R.A.; Reeder, P.L.; Sunberg, D.S. Pacific Northwest Lab., Richland, WA (United States). Sep 1994. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-9409272–1: 1. workshop on accelerator based boron capture neutron therapy, Jackson, WY (United States), 12-14 Sep 1994). Order Number DE95004566. Source: OSTI; NTIS; INIS; GPO Dep.

Epithermal/thermal boron neutron-capture therapy (BNCT) is promising treatment method for malignant tumors. Because the doses and dose rates for medical therapeutic radiation are very close to the normal tissue tolerance, small errors in radiation delivery can result in harmful overdoses. A substantial need exists for a device that will monitor, in real time, the radiation dose being delivered to a patient. Pacific Northwest Laboratory (PNL) has developed a scintillating glass optical fiber that is sensitive to thermal neutrons. The small size of the fibers offers the possibility of in vivo dose monitoring at several points within the radiation field. The count rate of such detectors can approach 10 MHz because the lifetime of the cerium activator is fast. Fluxes typical of those in BNCT (i.e., 10^9 n/cm^2/sec) may be measured because of this potentially high count rate and the small diameter of the fiber.

8594 (UM-P–93/100b) **Nuclear techniques in medicine.** O'Keefe, G. (Austin Hospital, Heidelberg, VIC (Australia)). Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 11p. Order Number DE95615699. Source: OSTI; NTIS (US Sales Only); INIS.

Nuclear physics has played a large role in medical treatment and diagnosis, from the technologies used in nuclear physics experiments to nuclear reactions. Particle detector technology from experimental nuclear and particle physics is the basis of the various tomographic imaging modalities such as: the radioactive tracers used in nuclear medicine result from neutron induced reactions using nuclear reactor facilities; cyclotron production of short-lived isotopes which allows metabolism of brain and cardiac tissue to be measured; in-vivo neutron activation analysis which allows the measurement of trace elements in the body. The purpose of this presentation is to illustrate some of those techniques such as, particle-beam treatments, neutron activation analyses, magnetic resonance imaging, and the physics involved. 5 figs., 1 tab., ills.

5507 Microbiology

Refer also to citation(s) 7155, 7200

8595 (BNL–61114) **Can we estimate bacterial growth rates from ribosomal RNA content?.** Kemp, P.F. Brookhaven National Lab., Upton, NY (United States). [1995]. 39p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-9408199–1: NATO Advanced Study Institute on the molecular ecology of aquatic microbes, Tuscany (Italy), 28 Aug - 8 sep 1994). Order Number DE95004232. Source: OSTI; NTIS; GPO Dep.

Several studies have demonstrated a strong relationship between the quantity of RNA in bacterial cells and their growth rate under laboratory conditions. It may be possible to use this relationship to provide information on the activity of natural bacterial communities, and in particular on growth rate. However, if this approach is to provide reliably interpretable information, the relationship between RNA content and growth rate must be well-understood. In particular, a requisite of such applications is that the relationship must be universal among bacteria, or alternately that the relationship can be determined and measured for specific bacterial taxa. The RNA-growth rate relationship has not been used to evaluate bacterial growth in field studies, although RNA content has been measured in single cells and in bulk extracts of field samples taken from coastal environments. These measurements have been treated as probable indicators of bacterial activity, but have not yet been interpreted as estimators of growth rate. The primary obstacle to such interpretations is a lack of information on biological and environmental factors that affect the RNA-growth rate relationship. In this paper, the available data on the RNA-growth rate relationship in bacteria will be reviewed, including hypotheses regarding the regulation of RNA synthesis and degradation as a function of growth rate and environmental factors; i.e. the basic mechanisms for maintaining RNA content in proportion to growth rate. An assessment of the published laboratory and field data, the current status of this research area, and some of the remaining questions will be presented.

5510 Physiological Systems

Refer also to citation(s) 8585

5530 Agriculture and Food Technology

Refer also to citation(s) 8510

8596 (CNIC–00798) **Syntheses of nucleic acid and protein in somatic embryos of Fritillaria ussuriensis maxim in different development stages.** Wang Shuyu (Northeast Agricultural College, Haerbin (China)); Tang Wei; Wang Hui. China Nuclear Information Centre, Beijing, BJ (China). Sep 1993. 10p. (CSNAS–0075.). Order Number DE95612542. Source: OSTI; NTIS (US Sales Only); INIS.

After developing a procedure for somatic embryogenesis in Fritillaria ussuriensis, dynamics on the syntheses of DNA, RNA, and protein during globular, heart-shaped, torpedo-shaped, cotyledonary, and mature somatic embryo stages was demonstrated by both autoradiography and scintillation counting. The rates of syntheses of DNA, RNA, and protein gradually increase between the globular and cotyledonary somatic embryos stages. DNA, RNA, and protein synthesis rates are in peak at the cotyledonary later stage, precotyledonary stage, and cotyledonary stage, respectively. It appears that more DNA, RNA, and protein are synthesized in the cotyledonary somatic embryo stage than in other stages. All these results indicate that an increased syntheses of DNA, RNA, and protein is associated with the differentiation of embryogenic cells and organogenesis in somatic embryos.

8597 (CONF-9308258–Absts.) **The fifth international conference on Arabidopsis research.** Hangarter, R.; Scholl, R.; Davis, K.; Feldmann, K. Ohio State Univ. Research Foundation, Columbus, OH (United States). [1993]. 224p. Sponsored by USDOE, Washington, DC (United States);National Science Foundation, Washington, DC (United States);Department of Agriculture, Washington, DC (United States). DOE Contract FG02-93ER20123. From 5. international conference on arabidopsis research; Columbus, OH (United States); 19-22 Aug 1993. Order Number DE95004460. Source: OSTI; NTIS; GPO Dep.

This volume contains abstracts of oral and poster presentations made in conjunction with the Fifth International Conference on Arabidopsis Research held August 19–22, 1993 at the Ohio State University, Columbus, Ohio.

8598 (DOE/CE/15544–T9) **Develop a field grid system for yield mapping and machine control. Quarterly report, October 1–December 31, 1994.** South Dakota State Univ., Brookings, SD (United States). [1995]. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG01-92CE15544. Order Number DE95004703. Source: OSTI; NTIS; GPO Dep.

An attempt is made to further develop Field Grid Sense and to demonstrate its suitability for field production applications. More specifically, the operation of the patented hardware/software Field Grid Sense (FGS) system will be tested in crop harvesting to demonstrate the system's utility and to analyze the flexibility of operation under true field conditions. Additionally, FGS will again be used with chemical application equipment – equipment that needs modification to correct one or two slight shortcomings. This action will create improved systems and establish the worthiness, efficiency and necessity of chemical application equipment that is controlled and directed via the FGS package.

8599 (IA–1486, pp. 116) **Development of radiation-sterilized mannitol salt agar dip slide kit.** Stotland, A.; Bahar, J.; Eisenberg, E.; Rubinfeld, S. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993*. 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. OCTANOLS/radiosterilization; AGAR; CYSTAMINE; DIAGNOSTIC USES; GAMMA RADIATION; GERMICIDES; INDICATORS; OCTANOLS; RADIOSTERILIZATION; PATHOGENS; PHENOLS; SACCHARIDES; STAPHYLOCOCCUS

8600 (INIS-mf–15048) **Gas chromatographic analysis of volatile hydrocarbons to detect irradiated chicken, pork and beef - an intercomparison study. A report in English and German.** SozEp-Hefte, v. 1/1993. Schreiber, G.A.; Schulzki, G.; Spiegelberg, A.; Helle, N.; Adam, S.T.; Ammon, J.; Baumann, P.; Brockmann, R.; Baenziger, U.; Delincee, H.; Droz, C.; Estendorfer, S.; Gemperle, C.; Grabowski, H.U. von; Kaenzig, A.; Kroells, W.; Matter, L.; Metschies, M.; MiBundesgesundheitsamt, Berlin (Germany). Inst. fuer Sozialmedizin und Epidemiologie. 1993. 189p. (In English, German). Order Number DE95738866. Source: OSTI; NTIS (US Sales Only); INIS.

This report provides a detailed description of an inter-laboratory study to detect irradiation treatment of chicken carcasses, pork and beef using a method suitable for routine application. The 17 participating laboratories determined the quantity of four different radiation-induced hydrocarbons (1-tetradecene, pentadecane, 1,7-hexadecadiene, 8-heptadecene) in coded samples approx. 3 and 6 months after irradiation. The quantities detected were used to identify the samples as irradiated or non-irradiated. The samples of

each type of meat to be examined had been supplied by two different producers. The dose range that was tested (approx. 0.6 to 7.5 kGy) included commercially used doses (approx. 1 to 5 kGy). The method employed enable 98.3% of a total of 864 samples to be correctly identified as irradiated or non-irradiated. This result is remarkable: Although the marker concentrations in the various samples showed a clear dose dependency, the variation was quite marked. The high rate of correct identifications could be achieved by defining a sample only as irradiated if certain quantities of at least 3 of the radiolytic products to be determined had been found. A similar identification rate was achieved if quantification of markers was omitted to identify a sample only as irradiated when all the expected radiolysis products could be clearly detected. For all three types of meat, no significant differences in marker yields could be shown for the products of the respective two producers. Also, in none of the types of meat, any significant difference could be revealed for the quantiatitive results achieved three and six months after irradiation. These results show that irradiation of chicken carcasses, pork and beef in the commerically used dose range can be clearly detected throughout the entire period in which products are normally stored and that the method described is suitable for routine analyses in food control laboratories. (orig.)

8601 (INIS-mf–15049) **Thermoluminescence analysis to detect irradiated spices, herbs and spice-and-herb mixtures - an intercomparison study. A report in English and German.** SozEp-Hefte, v. 2/1993. Schreiber, G.A.; Wagner, U.; Leffke, A.; Helle, N.; Ammon, J.; Buchholtz, H.V.; Delincee, H.; Estendorfer, S.; Fuchs, K.; Grabowski, H.U. von; Kruspe, W.; Mainczyk, K.; Muenz, H.; Nootenboom, H.; Schleich, C.; Vreden, N.; Wiezorek, C.; Boegl, K.W. Bundesgesundheitsamt, Berlin (Germany). Inst. fuer Sozialmedizin und Epidemiologie. 1993. 229p. (In English, German). Order Number DE95738865. Source: OSTI; NTIS (US Sales Only); INIS.

This report describes in detail an inter-laboratory test to detect the irradiation of spices, herbs and spice-and-herb mixtures in the dose range used for reduction of the number of contaminating microorganisms. Approx. 3 months and 9 months after irradiation the 14 participating laboratories determined the thermoluminescence (TL) of mineral contaminations that were isolated from coded samples. 18 different products (six spices, six herbs and six spice-and-herb mixtures) were examined. By whole sample analysis results were obtained in the inter-laboratory test which are typical for this method: Only one non-irradiated sample was classified as irradiated. By contrast, from some spice or herb products (5) all irradiated samples were correctly identified. From other products (3) some irradiated samples could not be identified as irradiated. From the rest of products (4) the majority of the irradiated samples was not identified as irradiated. Therefore, it is not possible to state definitively whether the whole sample method can be recommended as a screening technique. The decision rests with the user. However, data analysis of whole sample measurements revealed that the TL intensities of non-irradiated samples were within the same order of magnitude. Thus, there is no further need for establishing product-specific threshold values. The results make it clear that irradiation of spices, herbs and spice-and-herb mixtures with commercially used doses can be clearly detected by determination of TL signals of contaminating minerals throughout the entire period in which the products are normally stored and that the methods described are suitable for routine analysis in food inspection laboratories. (orig./UHE)

8602 (KAERI/RR–1227/92) **Studies on application of radiation and radioisotopes.** Kim, Jae Rok; Lee, Ji Bok; Lee, Yeong Iil; Jin, Joon Ha; Beon, Myeong Uh; Park, Kyeong Bae; Han, Heon Soo; Jeong, Yong Sam; Uh, Jong Seop; Kang, Kyeong Cheol; Cho, Han Ok; Song, Hui Seop; Yoon, Byeong Mok; Jeon, Byeong Jin; Park, Hong Sik; Kim, Jae Seong;.Korea Cancer Center Hospital, Seoul (Korea, Republic of). May 1993. 162p. (In Korean). Order Number DE95612538. Source: OSTI; NTIS; INIS.

With the completion of construction of KMRR, the facility and technology of radiation application will be greatly improved. This study was performed as follows; (1) Studies on the production and application of radioisotopes. (2) The development of radiation processing technology. (3) The application of Irradiation techniques for food preservation and process improvement. (4) Studies on the radiation application for the development of genetic resources (5) Development of the radioisotope (RI) production facilities for Korea Multipurpose Research Reactor (KMRR).

8603 (KAERI/RR–1251/93) **Development of technique on the induction and selection of in vitro mutant lines (Potato, Solanum tuberosum L.).** Yoo, Jang Ryoel (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Lee, Yeong Il; Song, Hee Seop; Kim, Jae Seong; Sin, In Cheol; Lee, Sang Jae; Lee, Ki Un; Lim, Yong Taek. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Sep 1993. 57p. (In Korean). Order Number DE95612529. Source: OSTI; NTIS; INIS.

For the development of the technique on the plant tissue culture and application of nuclear technique in the in vitro mutation breeding, present research laid emphasis on the development of techniques of potato tissue culture, and on the induction and selection of radiation mutation. Another culture for haploid induction, optimum radiation dosage for cybrid formation of potato and mutation induction from in vitro cultured microtuber and plantlets were investigated for modelling the technique on the induction and selection of in vitro mutant lines. Inheritance stability of the selected mutants were also studied in field condition. In vitro system of micropropagation and selection of mutation was summarized.

8604 (KAERI/RR–1252/93) **Studies on safety and efficacy of gamma-irradiated ginseng -Development of irradiation techniques for quality improvement of ginseng products.** Cho, Han Ok (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Byeon, Meong Uh; Yang, Jae Seung; Cho, Seong Ki; Kang, Il Joon. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Oct 1993. 50p. (In Korean). Order Number DE95615625. Source: OSTI; NTIS; INIS.

The fourth year research program on Korean ginseng was carried out in order to improve in the microbiological quality and physical properties of red ginseng and its processing by application of irradiation technology. The quality of red ginseng and their products were strictly controlled by government invested Korean Tobacco Ginseng Co., but there is a need of alternative technology for decontaminating and disinfestating in view of supplying stable raw material and securing the hygienic production because the use of food fumigants and preservatives has been restricted due to their harmful effects on human and environment. It is desirable that the limited moisture content of red ginseng product should be increased, considering the economic and physical properties of its products, by application of irradiation technology for sterilization of prepackaged red ginseng products. Red ginseng products were irradiated at dose of 0, 5, 7.5, 10 kGy respectively, following moisture content of sample were increased up to 14%, 16%, 18% and 20% by keeping at humidity controlled desiccator. Each sample stored at ambient temperature (20 deg C, 70% RH) and accelerated storage condition (40 deg C, 90% RH) were used for the evaluation of microbiological quality, TBA value, color difference measurement, hydrogen donating activity, HPLC pattern and content of saponins, change of fatty acids and characteristics of moisture absorption.

8605 (KAERI/RR–1321/93) **The application of irradiation techniques for food preservation and process improvement - Studies on application of radiation and radioisotopes-.** Byeon, Myeong Uh (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Cho, Han Ok; Yang, Jae Seung; Cho, Seong Ki; Kang, Il Joon. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jul 1994. 152p. (In Korean). Order Number DE95612539. Source: OSTI; NTIS; INIS.

With the increased consumption of processed food, quality control techniques are inevitably required in the food industry for its mass production and distribution. Recently, there has been a growing interest in the use of irradiation for solving the infrastructural problems in the food industry by developing viable alternatives to conventional technology and by improving the quality of processed foods. Even though food irradiation technology has been commercialized in 25 countries, and 18 items of irradiated foods have been approved for human consumption domestically, infrastructural studies are needed for the practical application of this technology. In order to enlarge the utilization of irradiation technology in solving

the infrastructural problems of the food industry, this project was designed to investigate the efficacy of gamma irradiation for improving the process and physical properties of dried foods (corn and soybean), for preserving the reserved foods for emergency (red pepper) and for producing natural products (red polyketied pigment) using microbial immobilization with radiation-induced polymer.

56 BIOMEDICAL SCIENCES, APPLIED STUDIES

5601 Radiation Effects

Refer also to citation(s) 7460, 7467, 7481, 7482, 7753, 8198, 8199, 8200, 8241, 8395, 8452, 8454, 8589, 8590, 8591, 8602, 8604, 8639, 8641

8606 (ACHRE–95003265) **Interim report of the Advisory Committee on human radiation experiments.** Advisory Committee on Human Radiation Experiments, Washington, DC (United States). 21 Oct 1994. 118p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95003265. Source: OSTI; NTIS; INIS; GPO; GPO Dep.

The Advisory Committee on Human Radiation Experiments was created by President Clinton to advise the Human Radiation Interagency Working Group on the ethical and scientific criteria applicable to human radiation experiments carried out or sponsored by the U.S. Government. The Committee seeks to answer several fundamental question: What ethics criteria should be used to evaluate human radiation experiments? What was the Federal Government's role in human radiation experiments? What are the criteria for determining appropriate Federal responses where wrongs or harms have occurred? What lessons learned from studying past and present research standards and practices should be applied to the future? The Committee has been gathering vast amounts of information and working to render it orderly and accessible. In the next six months, the Committee will continue with the tasks of data gathering and organizing. The focus of the work, however, will be developing criteria for judging historical and contemporary experiments, policies, and procedures, as well as criteria for remedies that may be appropriate where harms or wrongs have ocurred. Based on findings, the Committee will make specific recommendations regarding policies for the future.

8607 (ANL/CMB/CP–82396) **Hematopoietic tissue repair under chronic low daily dose irradiation.** Seed, T.M. Argonne National Lab., IL (United States). [1994]. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9407154–1: COSPAR '94, Hamburg (Germany), 11-21 Jul 1994). Order Number DE95004129. Source: OSTI; NTIS; INIS; GPO Dep.

The capacity of the hematopoietic system to repair constantly accruing cellular damage under chronic, low daily dose gamma irradiation is essential for the maintenance of a functional hematopoietic system, and, in turn, long term survival. In certain individuals, however, such continuous cycles of damage and repair provide an essential inductive environment for selected types of hematopathologies, e.g., myeloid leukemia (ML). We have been studying temporal and causal relationships between hematopoietic capacity, associated repair functions, and propensities for hematologic disease in canines under variable levels of chronic radiation stress (0.3–26.3 cGy d^{-1}). Results indicate that the maximum exposure rate tolerated by the hematopoietic system is highly individual-specific and is based largely on the degree to which repair capacity, and, in turn, hematopoietic restoration, is augmented under chronic exposure. In low-tolerance individuals (prone to aplastic anemia, subgroup (1), the failure to augment basic m-pair functions seemingly results in a progressive accumulation of genetic and cellular damage within vital progenitorial marrow compartments particularly marked within erythroid compartments. that results in loss of reproductive capacity and ultimately in collapse of the hematopoietic system. The high-tolerance individuals (radioaccomodated and either prone- or not prone to ML, subgroup 2 & 3 appear to minimize the accumulating damage effect of daily exposures by extending repair functions, which preserves reproductive integrity and fosters regenerative hematopoietic responses. As the strength of the regenerative response manifests the extent of repair augmentation, the relatively strong response of high- tolerance individuals progressing to patent ML suggests an insufficiency of repair quality rather than repair quantity.

8608 (ANL/ER–3) **Radium in humans: A review of U.S. studies.** Rowland, R.E. Argonne National Lab., IL (United States). Sep 1994. 233p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. Order Number DE95006146. Source: OSTI; NTIS; INIS; GPO Dep.

This document was originally conceived as a compilation of activities at Argonne National Laboratory that were directed toward the study of radium in humans. However, it soon became obvious that this was a very limited approach, because such a compilation would include no background on the widespread uses of radium in industry and in the medical profession, nor would it address the early history of the discovery of the hazards of radium. Such an approach would also ignore contributions to the study of radium effects made at other laboratories. This document now addresses these topics, in order to give an overall picture of what might be called the radium era, that period from the early part of this century, when radium was rapidly exploited as a tool and a medication, to the present time, when radium is not generally used and the study of its effects has been terminated. The appendix to this review lists all of the measured radium cases, a total of 2,403 individuals whose records were in the files at the end of 1990. For each case the route of exposure, the dates of exposure, the years of birth and death, the measured body content, the calculated intake and dose, and the cause of death have been listed. 165 refs.

8609 (CNIC–00774) **Study on LOMI decontamination technology.** Huang Fuduan (Nuclear Power Institute of China, Chengdu, SC (China)); Yu Degui; Lu Jingju; Xie Yinyan. China Nuclear Information Centre, Beijing, BJ (China). Oct 1993. 14p. (In Chinese). (SINRE–0040.). Order Number DE95612557. Source: OSTI; NTIS (US Sales Only); INIS.

The results of decontamination technique of Low-Oxidation-State Metal-Ion (LOMI) reagents developed from 1986 to 1991 in the laboratory are introduced. The experiments included preparation of LOMI reagents, de-filming efficiency, corrosion behavior of typical alloys, decontamination factors of reagents for contaminated materials and components have proved that the NP/LOMI decontamination method and treatment technique of waste water are feasible and have some advantages. The preparation of LOMI reagent with low concentration of formic acid by reduced pressure distilling technique and the utilization ratio of vanadium reached to 95% by second electrolysis are the main contributions of the study to the decontamination technique.

8610 (CNIC–00796) **Pathology study of radiation injury in the rat testes.** Wang Xiuzhen (Suzhou Medical Coll., JS (China)); Guo Yuhua; Wang Yuanchang; Wang Xiangying; Zhu Yanyun. China Nuclear Information Centre, Beijing, BJ (China). Oct 1993. 14p. (In Chinese). (SMC–0100.). Order Number DE95612492. Source: OSTI; NTIS (US Sales Only); INIS.

By applying the dynamics of the seminiferous epithelium and transmission electron microscopy technique and experiment was completed to observe the changes of seminiferous epithelium, tunica propria enveloping seminiferous tubules and AKP (Alkaline Phosphatase) in the tunica propria of rats after they were irradiated with 4 Gy whole-body ^{60}Co gamma radiation. The injured features of spermatogenic cells, the sensitivity of AKP in the tunica propria to irradiation and the relationship of AKP within tunica propria with seminiferous epithelium during injuring and repairing process are discussed. The results show that the differentiated spermatogonia are the most sensitive to irradiation. After 4 Gy whole-body ^{60}Co γ-radiation the injured seminiferous epithelium can be recovered and the survived radiation-resistant stem spermatogonia are the sole origin for repairing the seminiferous epithelium. The ultrastructure of sertoli cells changes with the diminution of spermatogenic cells. The tunica propria becomes thicker and folded after irradiation. The AKP within the tunica propria can resist higher dose. After 12 days of irradiation the AKP reactions in tunica propria is considerably

decreased, the recovery of AKP reactions is earlier than seminiferous epithelium.

8611 (DOE/EH–0445) **Human radiation experiments: The Department of Energy roadmap to the story and the records.** USDOE Assistant Secretary for Environment, Safety, and Health, Washington, DC (United States). Feb 1995. 302p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95006364. Source: OSTI; NTIS; INIS; GPO Dep.

The role of the US Government in conducting or sponsoring human radiation experiments has become the subject of public debate. Questions have been raised about the purpose, extent, and health consequences of these studies, and about how subjects were selected. The extent to which subjects provided informed consent is also under scrutiny. To respond to these questions, the Clinton administration has directed the US Department of Energy (DOE), along with other Federal agencies, to retrieve and inventory all records that document human radiation experiments. Many such records are now publicly available and will permit an open accounting and understanding of what took place. This report summarizes the Department's ongoing search for records about human radiation experiments. It is also a roadmap to the large universe of pertinent DOE information. DOE is working to instill greater openness–consistent with national security and other appropriate considerations–throughout its operations. A key aspect of this effort is opening DOE's historical records to independent research and analysis.

8612 (DOE/ER/60656–7) **Cellular morphometry and cycling cell populations of human and dog bronchi. Annual progress report, April 1, 1994–March 31, 1995.** Robbins, E.S. New York Univ. Medical Center, NY (United States). Dept. of Cell Biology. Dec 1994. 30p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-88ER60656. Order Number DE95003789. Source: OSTI; NTIS; INIS; GPO Dep.

Quantitative data of the human bronchial epithelial cells at possible risk for malignant transformation in lung cancer is crucial for accurate radon dosimetry and risk analysis. The nuclei of these cells may be targets for damage by α particles. Then it is important to determine the locations and other parameters of these nuclei in different airway generations, among smokers, non-smokers and ex-smokers, between men and women and in people of different ages. This proposal includes extended morphometric studies on electron micrographs of human bronchial epithelium of defined airway generations. The second part of this proposal describes the continuation of studies to quantitate the cycling tracheo-bronchial epithelial population(s) using proliferation markers and immunocytochemistry on paraffin sections. The proliferative potential of the airway mucosa of smokers, non-smokers, and ex-smokers, men and women, as well as individuals of different ages are being compared. Normal human bronchial linings are also being compared with normal adult dog bronchi and metaplastic and repairing human airways. Since cycling cells can be more sensitive to damage from carcinogens and radioactivity, the quantitative data from this project will allow the development of more accurate radon risk analysis.

8613 (INIS-mf–13801, pp. RC12) **The lethal effect of gamma irradiation on the meta cestode of Taenia solium in pork.** Nunez, E.F. (Universidad Nacional Autonoma de Mexico, Mexico City (Mexico)); Schunemann, A.A.; Pedraza, C.L. Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico); Instituto de Investigaciones Electricas, Cuernavaca (Mexico); Universidad Autonoma del Estado de Morelos (UAEM), Cuernavaca (Mexico). 1992. 30p. (CONF-9208272–: 9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry, Cuernavaca (Mexico), 16-21 Aug 1992). In *9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry. Abstracts.* Order Number DE95611878. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. CESTODES/biological radiation effects; MEAT/radicidation; CESTODES; COBALT 60; INOCULATION; LARVAE; MEAT; RADICIDATION; MEXICO; PUBLIC HEALTH; RADIATION DOSES

8614 (INIS-mf–14447) **Influence of recD1013 and recJ284 mutations of Escherichia coli on indirect recombinogenesis of lambda phage.** Valdes, M. J. Universidad Autonoma del Estado de Mexico, Toluca (Mexico). Escuela de Ciencias Quimicas. 1994. 77p. (In Spanish). Order Number DE95615559. Source: OSTI; NTIS (US Sales Only); INIS.

Escherichia coli, as many other organisms, has genetic repair mechanisms that increase the survival when its genetic material has been damaged. A consequence of such mechanisms is known as the indirect recombinogenesis of lambda phage. It appears when this phage multiplies into a damaged host bacterium and consists of a stimulation in recombination processes between different viral chromosomes. There are no evidences about the origin of such stimulation, but it seems that RecBCD enzyme from E. coli is necessary for this phenomenon to take place. In this work the role of the RecBCD double-strand DNA exonuclease activity (specified by RecD sub unity of the enzyme) has been studied, to determine if this enzymatic activity is required for the indirect recombinogenesis of lambda phage and with this purpose, recD1013 mutants of E. coli were used as hosts in lambda phage crosses. recD1013 mutants are deficient in the double-stranded DNA exonuclease activity of RecBCD but normal in their recombination and DNA repair abilities, seemingly thanks to the presence of a functional recJ gene, whose product is a double-strand DNA exonuclease too. The results show that the indirect recombinogenesis of lambda needs a functional recD gene and so the RecBCD exonuclease activity should be essential for the event. However, they do not allow to establish if this activity is enough or some other of the multiple activities of the enzyme are required. Since RecBCD is inhibited by lambda-Gamm protein during the lytic growth of the phage, there should be some way to counteract the inhibition made by this protein, unless the concentration reached by Gamm in infected cells is too low to suppress completely the action of the enzyme RecBCD. The results too show that in our experimental conditions, the exonuclease specified by RecBCD cannot be substituted by the activity of the recJ gene product in the indirect recombinogenesis of lambda.

8615 (INIS-mf–14451) **Evaluation of recurrent radiation with Cobalt 60 gamma rays on agronomic traits of barley (Hordeum Vulgare L.) in the R_2M_1 generation.** Vega G, M.G. No corporate text available. 1994. 90p. (In Spanish). Order Number DE95615563. Source: OSTI; NTIS (US Sales Only); INIS.

The objective of this work was to evaluate the effect of recurrent radiation on agronomic traits in two barley varieties. The research was carried out at experimental fields pertaining to the Instituto de Investigacion Agropecuaria, Acuicola y Forestal of the Estado de Mexico (ICAMEX). The biological material was irradiated in the Gamma Cell 220 at the Instituto Nacional de Investigaciones Nucleares (ININ). The experimental design was divided plots in the randomized blocks, with four replications. The factor varieties (Cerro Prieto and Puebla) was assigned to the big plots mean while in the factor doses was assignated to the small plots (0, 10, 20, 30, 40 and 50 krad of gamma rays). The variables under study were: germination, number of shoots, plant height, incidence of Puccinia striiformis, days to flowering, days to physiological maturity, spike length and yield. The analysis of variance exhibited no significant differences between varieties for all the studied variables. Regarding to dose, most of the studied variables exhibited significant differences, except for incidence of Puccinia striiformis and days to flowering. The interaction variety x doses showed significance only for the variable days to flowering and days to physiological maturity. The mean separation by Tukey test at 0.05 and the regression analysis showed that the variables: germination, number of shoots, plant height, spike length and yield decreased as the dose increased. On the other hand in the variables incidence of Puccinia striiformis, days to flowering and days to physiological maturity exhibited a direct relationship with the dose. (Author).

8616 (INIS-mf–14454) **Effects of arsenic upon the no-disyuntion and X chromosome loss mechanisms in Drosophila melanogaster.** Gomez C, M.T. Universidad Autonoma del Estado de Mexico, Toluca (Mexico). Escuela de Ciencias Quimicas. 1994. 82p. (In Spanish). Order Number DE95615566. Source: OSTI; NTIS (US Sales Only); INIS.

In the present investigation we make the analysis of the effect of the sodium arsenite chemistry in concentration 0.2 m M over the events of no-disyuntion and chromosome loss X in germinal cells

of Drosophila melanogaster. The Drosophila lineages used for this assay were: females (y^2 w^a /y^2 w^a ; e/e) and males (X^{C2} yf bb- / B^s Y y+). Those lineages were propagated and isolated for to be used after in the assays. Subsequently these, we make some links types with these individuals with the object to observed the effects of the oral administration of sodium arsenite in the adult individuals, in each one, we induce a damage in the sperm of the male with gamma radiation (25 Gy) and was observed immediately the results of the different assay applied in the first generation (F_1). Finally, we analyze and compare the results in contrast with and other investigation we find that the chemistry cause a significant increment in the chromosome loss X either the No-disyuntion was not significative. Also, the arsenite sodium increment the male descendant productivity, so, we deduced that the sodium arsenite do not cause an inhibition of the reparation mechanisms present in the Drosophila melanogaster female ovocites, but the chemistry operated like a modulator of this mechanisms, and prevent an increment of the damage provoked for the gamma radiation over the Drosophila melanogaster male sperm. (Author).

8617 (KAERI/RR–1195/92) **A study on the radiation monitoring for the personnel.** Park, Kwang Hyun (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Han, Kwang Su; Chung, Chong Eun; Kim, Seung Bok; Kim, Jung Bok; Hong, Suk Boong; Hong, Hyeong Pyo. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Dec 1992. 129p. (In Korean). Order Number DE95612567. Source: OSTI; NTIS; INIS.

On the basis of survey and analysis for the radiation monitoring system at the particular area and system within the nuclear power plant, which was carried out in the previous year's basic research project, prototype of ambient environment radiation monitoring system for the nuclear facilities is developed and manufactured in this fiscal year. In this prototype, the hardware consists of the flat display device and electronic circuit wherein microprocessor is used, according to the direction of advanced technology, and the software is comprised of programs which are implemented by A8051 ASM Language and C-Language. Therefore, it is expected that above prototype can be applied not only to radiation monitoring system that is used in the area of nuclear facilities but also to environment monitoring system of a contamination area which causes the environment pollution problems, because of the flexibility for functional modification of this prototype. (Author).

8618 (KAERI/RR–1221/92) **Environmental radiation monitoring around the research reactors.** Lee, Jeong Ho (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Lee, Hyun Duk; Kim, Sam Rang; Lee, Chang Uh; Choi, Yong Ho; Kim, Jeong Moo; Lee, Myeon Joo; Lee, Myoung Ho; Hong, Kwang Hui; Lim, Moon Ho; Lee, Won Yoon; Park, Doo Won; Choi, SangKorea Cancer Center Hospital, Seoul (Korea, Republic of). Apr 1993. 200p. (In Korean). Order Number DE95612568. Source: OSTI; NTIS; INIS.

Environmental Radiation Monitoring was carried out measurement of environmental radiation and environmental radioactivity analysis around KAERI nuclear facilities and Seoul Research Reactor. The results of environmental radiation monitoring around KAERI nuclear facilities and Seoul Research Reactor are the follows: The average level of environmental radiation dose measured by NaI scintillation counter and accumulated radiation dose by TLD was almost same level compared with the past years. Gross α, β radioactivity in environmental sample was not found abnormal data. γ-radionuclides in water samples were not detected. But only radionuclide K-40, which is natural radionuclide, was detected in the all samples and Cs-137 was detected in the surface soil and discharge sediment. The average level compare with the past years, and Be-7 and Cs-137 were detected in some surface soil and discharge sediment by γ-spectrometry. (Author).

8619 (KAERI/RR–1308/93) **Environmental radiation monitoring around the research reactors.** Lee, Chang Woo (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Lee, Hyun Duk; Kim, Sam Rang; Choi, Yong Ho; Kim, Jeong Moo; Lee, Myeon Joo; Lee, Myeong Ho; Hong, Kwang Hee; Lim, Moon Ho; Lee, Won Yoon; Park, Do Won; Choi, Sang Do. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Apr 1993. 149p. (In Korean). Order Number DE95612569. Source: OSTI; NTIS; INIS.

Environmental radiation monitoring was carried out measurement of environmental radiation and environmental radioactivity analysis around KAERI nuclear facilities and Seoul research reactor. The results of environmental radiation monitoring around KAERI nuclear facilities and Seoul research reactor are the follows : The average level of environmental radiation dose measured by NaI scintillation counter and accumulated radiation dose by TLD was almost same level compared with the past years. Gross α, β radioactivity in environmental sample was not found abnormal data. γ-radionuclides in water samples were not detected. But only radionuclide K-40, which is natural radionuclide, was detected in the all samples and Cs-137 was detected in the surface soil and discharge sediment. The average level of environmental radiation dose around Seoul research reactor was almost same level compared with the past years, and Be-7 and Cs-137 were detected in some surface soil and discharge sediment by γ-spectrometry. (Author).

8620 (KAERI/RR–1315/93) **Development of a Real-Time radiological dose assessment system - A study on the radiation and environmental safety -.** Han, Moon Hee (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Lee, Young Bok; Kim, Eun Han; Suh, Kyung Suk; Hwang, Won Tae. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jul 1994. 205p. (In Korean). Order Number DE95612570. Source: OSTI; NTIS; INIS.

A real-time dose assessment system has been proposed for the rapid estimating of the hazard of a nuclear accident. A mass-consistent wind field generation model has been developed. This wind field generation model can handle the meteorological data transferred from several meteorological posts. Field tracer experiment was carried out with the aim of the specification of the characteristics of Korean micro meteorology and the increasement of the accuracy of the diffusion model. As tracer gas UF_6 was used and 50 persons were dispatched over the flat area of 1 km radius for sampling. The sampled gas was analysed by gas-chromatographer. (Author).

8621 (KAERI/RR–1320/94) **Development of Long-lived radionuclide handling technology -Development of Long-lived radionuclide transmutation technology-.** Park, Jin Ho (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Jeong, Won Myeong; Lee, Kyu Il; Uh, Moon Sik; Hwang, Doo Seong; Kim, Yeon Koo. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jul 1994. 177p. (In Korean). Order Number DE95612558. Source: OSTI; NTIS; INIS.

The final goals of this research are completion of design for construction of hot cell and auxiliary facilities, and development of main equipments for remote operation and on-line monitoring system of radioactivity in solution. This facilities will be used for active test of the group separation process, the partioning technology to separate the long-lived radionuclides and useful nuclides from radioactive liquid wastes. And high level radioactive material are treated as the form of solution in the group separation process. The fundamental design objectives for this facilities where work with highly radioactive and highly toxic materials are (1) to accomplish the purpose of active test for the group separation process, (2) to protect the environment, (3) to provide safe working condition, and (4) to keep radiation exposure to staff as low as practicable.

8622 (KAERI/RR–1324/94) **Environmental radiation monitoring and terrestrial radioecology -A study on the radiation and environmental safety-.** Lee, Jeong Ho (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Lee, Hyeong Deok; Kim, Sam Rang; Lee, Chang Uh; Choi, Yong Ho; Kim, Jeong Moo; Lee, Myeon Joo; Lee, Myeong Ho; Hong, Kwang Hee; Lim, Moon Ho; Lee, Won Yoon; Park, Doo Won; Choi, SKorea Cancer Center Hospital, Seoul (Korea, Republic of). Jul 1994. 150p. (In Korean). Order Number DE95612521. Source: OSTI; NTIS; INIS.

In order to investigate the root uptake and migrational behavior of radionuclides deposited into the farm-land during crop cultures, rice and soybean were cultures on lysimeters installed in a greenhouse and the solution of mixed radionuclides such as Mn-54, Co-60, Sr-85 and Cs-137 was distributed over the land surface on different growth stages of the crops. For Chinese cabbage and radish, the second year's radio-tracer experiments were carried out. Several procedures for the chemical analysis of plutonium in environmental samples were tested and alpha-spectrometry system

for the isotope analysis was established. The usefulness of the analysis technique in the environmental monitoring program was examined by practising the technique with soil samples. (Author).

8623 (KAERI/RR–1328/93) **Development of radiation protection and measurement technology -A study on the radiation and environmental safety-.** Chang, Si Young (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Seo, Kyeong Won; Yoon, Seok Cheol; Lee, Tae Yeong; Kim, Bong Hwan; Chung, Deok Yeon; Lee, Ki Chang; Kim, Jong Soo; Yoon, Yeo Chang; Kim, Jang Ryeol; Lee, Sang Yoon. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jul 1994. 219p. (In Korean). Order Number DE95612559. Source: OSTI; NTIS; INIS.

Reference radiation fields which can meet the national and international standard and criteria such as the ANSI N13.11 have been designed, produced and evaluated to maintain the national traceability and reliability of the radiation measurement and to provide precise calibration of the various radiation measuring instruments as well as standard irradiation of the personal dosimeters for the performance evaluation. Existing dose calculation algorithm has been improved to correctly evaluate the shallow dose from the β(Ti-204) + γ(Cs-137) mixed radiation exposure by applying the TLD response correction function newly derived in this study. A mathematical algorithm to calculate the internal dose from inhalation of the uranium isotopes has been developed on the basis of the ICRP-30 respiratory tract model. Detailed performance analysis of the KAERI lung counter has been carried out to participate in the intercomparison of lung dosimetry. A preliminary and basic study on the quantitative method of optimal dose reduction based on the ALARA concept has been performed to technically support and strengthen the national radiation protection infrastructure. (Author).

8624 (KAERI/RR–1352/93) **Studies on the radiation application for the development of genetic resources -Studies on application of radiation and radioisotopes-.** Lee, Young Il (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Song, Hi Sup; Kim, Jae Sung; Shin, In Chul; Lee, Sang Jae; Lee, Ki Woon; Lim, Yong Tack. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jul 1994. 96p. (In Korean). Order Number DE95612485. Source: OSTI; NTIS; INIS.

Present research carried out on the development of techniques of plant tissue culture, on the induction and selection of radiation mutation and on the evaluation of mutant germplasm of several important crops. Optimum dosage of radiation were investigated for induction of mutation and selection of mutant in field or in vitro culture. The optimum dosage of potato nodal stem was revealed the range of 30-50 Gy in in vitro cultured plants. Variation of such agronomic traits was observed as earliness, short culm, high yield and other promising characters derived from irradiated rice, soybean, perilla, potato and some other crops in field and in vitro culture. The rice mutants of 18 lines were selected from irradiated rice cultivars and 48 soybean mutants were selected for earliness, large seed size and 2,000 line of soybean and rice, perilla were evaluated for the preservation of germplasm. Influence of plant growth regulators on P-32 uptake was observed in Broccoli callus in vitro culture. (Author).

8625 (KAERI/RR–1385/93) **The effects of acute radiation exposure on the serum components.** Kim, Sang Bok (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Lee, Kang Seok; Park, Hyo Kook; Kim, Jin Kyu; Lee, Yoon Hwan. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Aug 1994. 65p. (In Korean). Order Number DE95612478. Source: OSTI; NTIS; INIS.

The blood samples were collected from the experimental animals 24 hrs after irradiation of gamma doses upto 80 Gy. Native PAGE showed a decreasing trend in gamma globulin fraction of serum from the irradiated group compared to control, while SDS PAGE indicated an enhanced tendency in protein of molecular weight 30,000 to 40,000. Serum albumin slightly decreased with radiation doses as a result of decrease in total protein amount. Radiation exposure had little or no effects on such lipid related components as phospholipid, triglyceride, and cholesterol, respectively. Among others, glutamic pyryvic transaminase (GPT) showed a drastic decrease in its amount 24 hrs after radiation exposure, which can be applied to the health care program for radiation workers. (Author).

8626 (ORAU–94/A-24) **Research priorities for occupational radiation protection.** Oak Ridge Inst. for Science and Education, TN (United States). Feb 1994. 38p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-76OR00033. Order Number DE95004798. Source: OSTI; NTIS; INIS; GPO Dep.

The Subpanel on Occupational Radiation Protection Research concludes that the most urgently needed research is that leading to the resolution of the potential effects of low-level ionizing radiation. This is the primary driving force in setting appropriate radiation protection standards and in directing the emphasis of radiation protection efforts. Much has already been done in collecting data that represents a compendium of knowledge that should be fully reviewed and understood. It is imperative that health physics researchers more effectively use that data and apply the findings to enhance understanding of the potential health effects of low-level ionizing radiation and improve the risk estimates upon which current occupational radiation protection procedures and requirements depend. Research must be focused to best serve needs in the immediate years ahead. Only then will we get the most out of what is accomplished. Beyond the above fundamental need, a number of applied research areas also have been identified as national priority issues. If effective governmental focus is achieved on several of the most important national priority issues, important occupational radiation protection research will be enhanced, more effectively coordinated, and more quickly applied to the work environment. Response in the near term will be enhanced and costs will be reduced by: developing microprocessor-aided "smart" instruments to simplify the use and processing of radiation data; developing more sensitive, energy-independent, and tissue-equivalent dosimeters to more accurately quantify personnel dose; and developing an improved risk assessment technology base. This can lead to savings of millions of dollars in current efforts needed to ensure personnel safety and to meet new, more stringent occupational guidelines.

8627 (ORAU–94/D-58) **Biological effectiveness of neutrons: Research needs.** Casarett, G.W.; Braby, L.A.; Broerse, J.J.; Elkind, M.M.; Goodhead, D.T.; Oleinick, N.L. Oak Ridge Associated Universities, Inc., TN (United States). Feb 1994. 194p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-76OR00033. Order Number DE95004795. Source: OSTI; NTIS; INIS; GPO Dep.

The goal of this report was to provide a conceptual plan for a research program that would provide a basis for determining more precisely the biological effectiveness of neutron radiation with emphasis on endpoints relevant to the protection of human health. This report presents the findings of the experts for seven particular categories of scientific information on neutron biological effectiveness. Chapter 2 examines the radiobiological mechanisms underlying the assumptions used to estimate human risk from neutrons and other radiations. Chapter 3 discusses the qualitative and quantitative models used to organize and evaluate experimental observations and to provide extrapolations where direct observations cannot be made. Chapter 4 discusses the physical principles governing the interaction of radiation with biological systems and the importance of accurate dosimetry in evaluating radiation risk and reducing the uncertainty in the biological data. Chapter 5 deals with the chemical and molecular changes underlying cellular responses and the LET dependence of these changes. Chapter 6, in turn, discusses those cellular and genetic changes which lead to mutation or neoplastic transformation. Chapters 7 and 8 examine deterministic and stochastic effects, respectively, and the data required for the prediction of such effects at different organizational levels and for the extrapolation from experimental results in animals to risks for man. Gaps and uncertainties in this data are examined relative to data required for establishing radiation protection standards for neutrons and procedures for the effective and safe use of neutron and other high-LET radiation therapy.

8628 (ORAU–94/F-10) **Committee on Interagency Radiation Research and Policy Coordination 10th anniversary report.** Oak Ridge Associated Universities, Inc., TN (United States). Jun 1994. 47p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-76OR00033. Order Number DE95004796. Source: OSTI; NTIS; INIS; GPO Dep.

Ten years ago, on April 9, 1984, the Science Advisor to the President, and Director of the Office of Science and Technology Policy, established the Committee on Interagency Radiation Research and Policy Coordination (CIRRPC) to meet the need for an interagency committee to address Congressionally mandated and agency-identified issues related to radiation research and policy. CIRRPC replaced the Committee on Interagency Radiation Policy, a committee of the Federal Coordinating Council for Science, Engineering and Technology, and assumed the responsibilities of the Interagency Radiation Research Committee and the Radiation Policy Council, whose charters had expired. Since then, CIRRPC has been recognized as an effective and respected mechanism for coordinating radiation policy among Federal agencies and as an efficient coordinator and evaluator of Federal efforts on designated radiation research projects. In the last 10 years, CIRRPC has established various Policy and Science Subpanels to undertake the oftentimes difficult task of resolving and coordinating agency policies and responses to issues dealing with radiation. These subpanels addressed such issues as the metrication of radiation units, the policy impact of the radioepidemiological tables, naturally occurring and accelerator-produced radioactive materials, radon protection and health effects, predisaster planning for human health effects research, and ionizing radiation risk assessment. These subpanels and their work represent CIRRPC's continuing effort to seek a common position on issues of national significance and interest.

8629 (ORAU–94/F-29) **Balancing radiation benefits and risks: The needs of an informed public.** Oak Ridge Associated Universities, Inc., TN (United States). Apr 1994. 65p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-76OR00033. Order Number DE95004794. Source: OSTI; NTIS; INIS; GPO Dep.

The American public's perceptions regarding ionizing radiation do not always conform to or correlate with scientific evidence. The ultimate purpose of this coordinated Federal effort and report is to increase the public's knowledge of the benefits and risks associated with ionizing radiation. This report is divided into five sections. The first section, Introduction, discusses the public's knowledge of radiation, their perceptions of benefits versus risks, and the Federal government's role in public education. The section also outlines the charge to the Subpanel. Radiation Issues and Public Reactions discusses several radiation issues important to Federal agencies for which public education programs need to be established or enhanced. Federal Programs describes Federal agencies with public education programs on radiation and the nature of the programs they support. Education Issues and Federal Strategies explores the elements identified by the Subpanel as critical to the development and implementation of an effective Federal program in the area of public education on radiation issues and nuclear technologies. An important issue repeatedly brought up during the public sector presentations to the Subpanel was the perceived lack of Federal credibility on radiation issues in the eyes of the public. To some degree, this concern was factored into all of the recommendations developed by the subpanel. The issues discussed in this section include the fragmented nature of Federal radiation programs and the need to improve credibility, promote agency responsiveness, and support the enhancement of scientific literacy. Finally, under Recommendations, the Subpanel discusses its overall findings and conclusions.

8630 (ORAU–94/G-111) **Committee on Interagency Radiation Research and Policy Coordination (CIRRPC).** Oak Ridge Associated Universities, Inc., TN (United States). 10 May 1994. 27p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-76OR00033. (CONF-9204300–: Workshop on internal dosimetry, Atlanta, GA (United States), 6-9 Apr 1992). Order Number DE95004797. Source: OSTI; NTIS; INIS; GPO Dep.

Enclosed are proceedings of the workshop on Internal Dosimetry held on Atlanta, Georgia in April 1992. The recommendations from the Workshop were considered by the CIRRPC Subpanel on Occupational Radiation Protection Research in identifying those areas to be undertaken by individual Federal Agencies or in cooperative efforts. This document presents summaries of the following sessions: A.1 Applications and limitations of ICRP and other metabolic models, A.2 Applications and implementation of proposed ICRP lung model, A.3 Estimates of intake from repetitive bioassay data, A.4 Chelation models for plutonium urinalysis data, B.1 Transuranium/uranium registry data, B.2 Autopsy tissue analysis, B.3 Bioassay / Whole body counting, B.4 Data base formatting and availability, C.1 An overview of calculational techniques in use today, C.2 The perfect code, C.3 Dose calculations based on individuals instead of averages, C.4 From macro dosimetry to micro dosimetry.

8631 (PNL-SA–21776) **Implications of scientific and technological developments for radiation protection in the next decade.** Johnson, J.R.; Stansbury, P.S.; Paretzke, H. Pacific Northwest Lab., Richland, WA (United States). Jan 1993. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-930181–2: Workshop on radiation protection toward the turn of the century, Paris (France), 11-13 Jan 1993). Order Number DE95004562. Source: OSTI; NTIS; INIS; GPO Dep.

There are scientific and technological developments taking place that will affect the understanding of the interaction of ionizing radiation with matter, the ability to measure the important parameters of ionizing radiation, and the ability to model radioactivity transport, both in the human body and in the environment. This paper focuses on emerging scientific and technological developments that will impact radiation protection in the next decade. Emerging scientific developments included in this paper are new methods and better analytic capabilities in epidemiology, a better understanding of the interactions between ionizing radiation and the various cellular components and more realistic models to describe the uptake, distribution, retention and excretion of radionuclides in humans. Technological developments include instruments to measure radioactivity in the humans and the environment, and better software to calculate doses from these previously measured quantities.

8632 (PNL-SA–24024) **Radiation-induced electron migration along DNA.** Fuciarelli, A.F. (Pacific Northwest Lab., Richland, WA (United States)); Sisk, E.C.; Miller, J.H.; Zimbrick, J.D. Pacific Northwest Lab., Richland, WA (United States). Apr 1994. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-940420–1: 18. L.H. Gray conference on radiation damage in DNA: physics, chemistry and molecular biology, Bath (United Kingdom), 10-14 Apr 1994). Order Number DE95004547. Source: OSTI; NTIS; INIS; GPO Dep.

Radiation-induced electron migration along DNA is a mechanism by which randomly produced stochastic energy deposition events can lead to nonrandom types of damage along DNA manifested distal to the sites of the initial energy deposition. Electron migration along DNA is significantly influenced by the DNA base sequence and DNA conformation. Migration along 7 base pairs in oligonucleotides containing guanine bases was observed for oligonucleotides irradiated in solution which compares to average migration distances of 6 to 10 bases for Escherichia coli DNA irradiated in solution and 5.5 base pairs for Escherichia coli DNA irradiated in cells. Evidence also suggests that electron migration can occur preferentially in the 5′ to 3′ direction along DNA. Our continued efforts will provide information regarding the contribution of electron transfer along DNA to formation of locally multiply damaged sites created in DNA by exposure to ionizing radiation.

8633 (PNL-SA–25192) **Early operating experience with large-area germanium detectors for detecting low-energy photons.** Rieksts, G.A.; Lynch, T.P.; Olsen, P.C. Pacific Northwest Lab., Richland, WA (United States). Nov 1994. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-9411105–2: 40. anniversary conference on bioassay, analytical and environmental radiochemistry, Cincinnati, OH (United States), 15-17 Nov 1994). Order Number DE95004575. Source: OSTI; NTIS; INIS; GPO Dep.

Intrinsic germanium (Ge) planar detector arrays have been used at Hanford for lung counting since 1983. This paper describes a counting system using an array of only four detectors, larger than those used in the past, using larger dewars and a simplified detector-positioning system. Typical detector elements have been 51 mm in diameter and 20 mm thick, with a beryllium window thickness of 0.51 mm. The resolution of the detectors has been about 560 eV for 6.4-keV x-rays and 700 eV for 122-keV gamma

rays. In the past, arrays of three, four, five, and six detectors have been employed. Six detectors have been the preferred configuration for lung counting. Up to 3,000 counts annually have been performed with these systems. When detectors fail and spares are not available, calibrations and calculational algorithms are maintained for four-detector configurations. For several years, both "bucket" and "stovepipe" designs have been used for the Dewars with the 15-liter dewars proving to be much more reliable than the "stovepipe" designs.

8634 (SLU-REK-R--73) **Estimated effects of radioactive fallout on agricultural production in Sweden. Contamination of crop products.** Eriksson, Aake; Loensjoe, H.; Karlstroem, F. Swedish Univ. of Agricultural Sciences, Uppsala (Sweden). Dept. of Radioecology. 1994. 76p. (In Swedish). Order Number DE95612522. Source: OSTI; NTIS; INIS.

The study is part of a research project, 'Radioactivity problems within the food sector' performed in 1991-94 at the request of the National Board of Agriculture in Sweden by The National Research Establishment, Dept. of NBC Defence, and the Dept. of Radioecology and the Dept. of Biosystems and Technology, the latter two belonging to the Swedish Univ. of Agricultural Sciences. The aim of the study was to investigate the contamination levels that may occur in agricultural crop products in Sweden in a situation of radioactive fallout from the use of nuclear weapons. There is a risk for a major nuclide transport in agricultural systems by the feeds, mainly by pasture grass and silage and hay crops but also to some extent by grain crops. For that reason, cattle are expected to be important vectors of the fallout nuclides to the human diet, particularly in milk from dairy cattle but also in beef. The activity transport by grain to pig products may also be of some importance. 8 refs, 7 figs, 25 tabs.

8635 (SLU-REK-R--75) **Estimated effects of radioactive fallout on agricultural production in Sweden. Contamination of animal products.** Eriksson, Aake (Swedish Univ. of Agricultural Sciences, Uppsala (Sweden). Dept. of Radioecology); Andersson, Inger. Swedish Univ. of Agricultural Sciences, Uppsala (Sweden). Dept. of Radioecology. 1994. 93p. (In Swedish). Order Number DE95612523. Source: OSTI; NTIS; INIS.

The present study is part of a research project, 'Radioactivity problems within the food sector' performed in 1991-94 at the request of the National Board of Agriculture in Sweden by The National Research Establishment, Dept. of NBC Defence, and the Dept. of Radioecology and the Dept. of Biosystems and Technology, the latter two belonging to the Swedish Univ. of Agricultural Sciences. The aim of the study was to analyze problems that may occur within food production systems in a situation of radioactive fallout from the use of nuclear weapons. The study is based on a scenario with the following general assumptions: The radioactivity can reach any part of the country and agricultural production areas within 24 hours after the detonation. The following wet deposition will cause an external radiation outdoor dose of 100 mSv during the first week. The ground deposition of the main nuclides per square meter is calculated to be 14.7 kBq of ^{137}Cs, 11.3 kBq of ^{90}Sr, 1.92 Mbq of ^{89}Sr and 14.4 Mbq of ^{131}I. The consequences of depositions on five different occasions during the season are calculated. The occasions are: Start of the vegetation period (1), Start of the first grazing period (2), End of the first grazing period and at the start of the grass harvest period (3), Start of the grass regrowth period (4) and Start of the regrowth grazing period and before the harvest of cereal crops (5). All alternatives are studied for each of the eight production areas of Sweden. The present report shows the nuclide transport to cows' milk, cattle meat and pigs' meat expressed as the activity concentrations in these products. Figures demonstrate the activity level of each nuclide in milk and cattle meat during the grazing period and during the following stable feeding period, which makes it possible to relate these levels to those permitted for products on the market. 8 refs, 8 figs, 10 tabs.

8636 (WHC-SD-SNF-AP--001) **Sealed canister liquid sampling for fuel characterization shipments.** Trimble, D.J. Westinghouse Hanford Co., Richland, WA (United States). 12 Jan 1995. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95005630. Source: OSTI; NTIS; INIS; GPO Dep.

N-Reactor spent fuel elements will be removed from the sealed fuel storage canisters in the KW Basin and shipped to the 300 Area hot cells for characterization studies. Some of the canisters contain broken fuel elements exposing metallic uranium to the canister water. The exposed uranium surfaces have reacted with the water releasing fission product nuclides to the canister water. The extent of this release is unknown, but large radionuclide inventories could cause significant releases to the basin water. To avoid this, a method is needed to evaluate the magnitude of the canister water radioactivity to help make decisions about which canisters should not be opened for fuel sampling. The objective of this document is to provide a conceptual description of the process for obtaining and evaluating gas and liquid samples from KW fuel canisters in support of fuel characterization shipments. Also described are the decisions regarding the acceptability of a sample, the actions to be taken to obtain an acceptable sample, and the logical leading to decisions about opening canisters for fuel characterization sampling. This document will help guide a safety analysis of the liquid sampling process and the development of detailed procedures for the process. Outside the scope of this document are the processes for opening canisters, selecting fuel samples from opened canisters, shipping fuel samples, and closing canisters.

8637 (WSRC-TR--94-054) **Hazards assessment document for receiving basin for offsite fuel (244-H) and resin regeneration facility (245-H) (RBOF/RRF).** Miner, A.N.; Ortaldo, S.F. Westinghouse Savannah River Co., Aiken, SC (United States). Jul 1994. 28p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC09-89SR18035. Order Number DE95004799. Source: OSTI; NTIS; INIS; GPO Dep.

The Hazard Assessment Document (HAD) for the Receiving Basin for Offsite Fuels (RBOF), Building 244-H, and the Resin Regeneration Facility (RRF), Building 245-H, was prepared in accordance with Department of Energy (DOE) Order 5480.23, DOE-STD-1 027-92, and WSRC-MS-92-206. The HAD provides hazards categorizations based on the radiological and chemical hazards associated with the facility. The hazard category is used to provide the input data for a graded approach to the development of the facility Safety Analysis Report (SAR) in accordance with DOE Order 5480.23. The RBOF/RRF was assumed to be a one segment facility. The accident consequences are calculated without consideration for any mitigative systems or administrative controls This facility is categorized as Hazard Category 2 as a result of the analysis of the radiological inventory conducted in accordance with Reference 2 and the chemical inventory in accordance with Reference 3.

5603 Chemicals Metabolism and Toxicology

Refer also to citation(s) 8461

8638 (BNL--60883) **Experimental evaluation of mercury release from molten lead.** Tutu, N.K.; Greene, G.A.; Van Tuyle, G.J. Brookhaven National Lab., Upton, NY (United States). [1994]. 17p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. Order Number DE95002414. Source: OSTI; NTIS; INIS; GPO Dep.

In order to assess the worst impact of an extremely improbable accident in an accelerator target for producing tritium, an event scenario was developed and analyzed, and an experiment was Performed to resolve an important question raised by the analysis. The target, known as SILC for "Spallation Induced Lithium Conversion," contains approximately 22 metric tons of Pb, with small inventories of potentially hazardous radionuclides which continue to accumulate as the production cycle continues. Analysis of a scenario involving several failures in the normal, backup, and emergency cooling systems is presented, including event simulation by BNL indicating when and how long the Pb continues to melt, and a summary of SNL estimates of the releases of potentially hazardous spallation products is given. Finally, a recent experiment is described in which it was shown that virtually no mercury is likely to escape from the molten Pb, a result having significant impact on the potential risk of such worst-case scenarios.

8639 (ES/ER/TM–76) **Toxicity values from the U.S. Environmental Protection Agency Integrated Risk Information System and Health Effects Assessment Summary Table.** Oak Ridge National Lab., TN (United States). Oct 1994. 133p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE95004877. Source: OSTI; NTIS; INIS; GPO Dep.

This document contains tables of toxicity values (reference doses, reference concentrations and slope factors for ingestion and inhalation exposure routes) which are compiled from the US EPA Integrated Risk Information System (IRIS) and Health Effects Assessment (HEAST) tables. These values are to be used in risk assessments at all US DOE Oak Ridge/Environmental Restoration Division (OR/ERD) sites. In addition, this revision includes dermal risk values which have been calculated using EPA methodology although they have not been through the EPA review process for approval.

8640 (ES/ER/TM–85/R1) **Toxicological benchmarks for screening potential contaminants of concern for effects on terrestrial plants: 1994 revision.** Will, M.E.; Suter, G.W. II. Oak Ridge National Lab., TN (United States). Sep 1994. 123p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE95004732. Source: OSTI; NTIS; INIS; GPO Dep.

One of the initial stages in ecological risk assessment for hazardous waste sites is screening contaminants to determine which of them are worthy of further consideration as contaminants of potential concern. This process is termed contaminant screening. It is performed by comparing measured ambient concentrations of chemicals to benchmark concentrations. Currently, no standard benchmark concentrations exist for assessing contaminants in soil with respect to their toxicity to plants. This report presents a standard method for deriving benchmarks for this purpose (phytotoxicity benchmarks), a set of data concerning effects of chemicals in soil or soil solution on plants, and a set of phytotoxicity benchmarks for 38 chemicals potentially associated with United States Department of Energy (DOE) sites. In addition, background information on the phytotoxicity and occurrence of the chemicals in soils is presented, and literature describing the experiments from which data were drawn for benchmark derivation is reviewed. Chemicals that are found in soil at concentrations exceeding both the phytotoxicity benchmark and the background concentration for the soil type should be considered contaminants of potential concern.

8641 (ES/ER/TM–125) **Estimating exposure of terrestrial wildlife to contaminants.** Sample, B.E.; Suter, G.W. II. Oak Ridge National Lab., TN (United States). Sep 1994. 50p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE95004880. Source: OSTI; NTIS; INIS; GPO Dep.

This report describes generalized models for the estimation of contaminant exposure experienced by wildlife on the Oak Ridge Reservation. The primary exposure pathway considered is oral ingestion, e.g. the consumption of contaminated food, water, or soil. Exposure through dermal absorption and inhalation are special cases and are not considered hereIN. Because wildlife mobile and generally consume diverse diets and because environmental contamination is not spatial homogeneous, factors to account for variation in diet, movement, and contaminant distribution have been incorporated into the models. To facilitate the use and application of the models, life history parameters necessary to estimate exposure are summarized for 15 common wildlife species. Finally, to display the application of the models, exposure estimates were calculated for four species using data from a source operable unit on the Oak Ridge Reservation.

8642 (ES/ER/TM–126) **Toxicological benchmarks for screening potential contaminants of concern for effects on soil and litter invertebrates and heterotrophic process.** Will, M.E.; Suter, G.W. II. Oak Ridge National Lab., TN (United States). Sep 1994. 151p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE95004879. Source: OSTI; NTIS; INIS; GPO Dep.

One of the initial stages in ecological risk assessments for hazardous waste sites is the screening of contaminants to determine which of them are worthy of further consideration as "contaminants of potential concern." This process is termed "contaminant screening." It is performed by comparing measured ambient concentrations of chemicals to benchmark concentrations. Currently, no standard benchmark concentrations exist for assessing contaminants in soil with respect to their toxicity to soil- and litter-dwelling invertebrates, including earthworms, other micro- and macroinvertebrates, or heterotrophic bacteria and fungi. This report presents a standard method for deriving benchmarks for this purpose, sets of data concerning effects of chemicals in soil on invertebrates and soil microbial processes, and benchmarks for chemicals potentially associated with United States Department of Energy sites. In addition, literature describing the experiments from which data were drawn for benchmark derivation. Chemicals that are found in soil at concentrations exceeding both the benchmarks and the background concentration for the soil type should be considered contaminants of potential concern.

8643 (LUNBDS-NBBE–94-1043) **Beech (Fagus sylvatica) seedling growth and nutrition - effects of acid soils and liming.** Ljungstroem, M. Lund Univ. (Sweden). Dept. of Ecology. 1994. 19p. Order Number DE95737654. Source: OSTI; NTIS.

The purpose of this investigation was to elucidate why beech (Fagus sylvatica L.) seedlings grow poorly on acid soils, and to test if liming and phosphate addition can improve their growth and survival. Pot experiments were carried out with natural soils, differing regarding the acidity regime. A field experiment with dolomitic lime and phosphate fertilizer was conducted in naturally regenerating beech stands. Two predictions derived from the concept of steady state nutrition were tested viz. the relative growth rates of plant parts and the relative uptake rates of nutrients are equal. Aluminium toxicity did not seem to cause the slow growth and the increased mortality observed in some of the acid soils studied. An inability to take up phosphorus was demonstrated for the eluvial horizon in a podzol. This may be the cause of reduced growth and damage symptoms of beech seedlings in acid soils. The low phosphorus uptake might be explained by interaction effects involving acidity, iron and organic compounds. Further investigations are needed on the interactions between acidity, phosphorus uptake, organic compounds, iron and aluminium. Dolomitic lime treatment did not improve either the survival or the growth of naturally established beech seedlings on acid brown soil and podzol. However, the treatments increased foliar calcium, magnesium and phosphorus concentration, but reduced that of potassium. 53 refs, 2 figs, 2 tabs

8644 (ORNL–6818) **Statistical methods for the analysis of a screening test for chronic beryllium disease.** Frome, E.L. (Oak Ridge National Lab., TN (United States). Mathematical Sciences Section); Neubert, R.L.; Smith, M.H.; Littlefield, L.G.; Colyer, S.P. Oak Ridge National Lab., TN (United States). Oct 1994. 58p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE95004783. Source: OSTI; NTIS; GPO Dep.

The lymphocyte proliferation test (LPT) is a noninvasive screening procedure used to identify persons who may have chronic beryllium disease. A practical problem in the analysis of LPT well counts is the occurrence of outlying data values (approximately 7% of the time). A log-linear regression model is used to describe the expected well counts for each set of test conditions. The variance of the well counts is proportional to the square of the expected counts, and two resistant regression methods are used to estimate the parameters of interest. The first approach uses least absolute values (LAV) on the log of the well counts to estimate beryllium stimulation indices (SIs) and the coefficient of variation. The second approach uses a resistant regression version of maximum quasi-likelihood estimation. A major advantage of the resistant regression methods is that it is not necessary to identify and delete outliers. These two new methods for the statistical analysis of the LPT data and the outlier rejection method that is currently being used are applied to 173 LPT assays. The authors strongly recommend the LAV method for routine analysis of the LPT.

5604 Other Environmental Pollutant Effects

Refer also to citation(s) 8585

57 HEALTH AND SAFETY

Refer also to citation(s) 7853

8645 (UCRL-JC–118082) **The challenge of emergency response dispersion models on the meso-gamma urban scale: A case study of the July 26, 1993 Oleum tank car spill in Richmond, California.** Baskett, R.L. (EG and G Energy Measurements, Inc., Pleasanton, CA (United States)); Vogt, P.J.; Schalk, W.W.; Pobanz, B.M.; Foster, C.S.; Ellis, J.S. Lawrence Livermore National Lab., CA (United States). Aug 1994. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48 ; AC08-93NV11265. (CONF-9404202–2: Physical colloquium of Hamburg University, Hamburg (Germany), 14 Apr 1994). Order Number DE95006167. Source: OSTI; NTIS; GPO Dep.

This paper presents a recent case study that illustrates the difficulty of modeling accidental toxic releases in urban area. On the morning of July 26, 1993, oleum was accidentally released from a railroad tank car in Richmond, California. State and local agencies requested real-time modeling from the Atmospheric Release Advisory Capability (ARAC) at Lawrence Livermore National Laboratory (LLNL). Although the ARAC's with the US Department of Energy is for nuclear materials, the team responded to the accident under an Agreement in Principle with the State of California. ARAC provided model plots describing the location and progress of the toxic cloud to the agencies managing the response. The primary protective action for the public was to shelter in place. Highways, rail lines and public transportation were blocked. The incident was significant, enough that over 24,000 people sought medical attention within the week following the release.

58 GEOSCIENCES

Refer also to citation(s) 7246, 7365, 8422, 8428, 8474

8646 (BNL–52450) **Seismic analysis of the Par Pond Dam: Study of slope failure and liquefaction. Technical evaluation report.** Simos, N.; Reich, M. Brookhaven National Lab., Upton, NY (United States). Jul 1994. 98p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. Order Number DE95005654. Source: OSTI; NTIS; GPO Dep.

Stability concerns of the Par Pond Dam, an embankment structure in the Savannah River Site complex, resulted in a comprehensive evaluation of the state of its integrity. Specifically, excessive seepage through the embankment, slope failure due to an earthquake event as well as liquefaction potential of the embankment and the foundation are addressed and the potential of failure is evaluated. Lastly, remedial benefits of the addition of a berm structure are also assessed.

8647 (DOE/BC–95000129) **Predicting the transport properties of sedimentary rocks from microgeometry.** Schlueter, E.M. Lawrence Berkeley Lab., CA (United States); California Univ., Berkeley, CA (United States). Dept. of Materials Science and Mineral Engineering. Feb 1995. 92p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00098. Order Number DE95000129. Source: OSTI; NTIS; GPO Dep.

The author investigates through analysis and experiment how pore geometry, topology, and the physics and chemistry of mineral-fluid and fluid-fluid interactions affect the flow of fluids through consolidated/partially consolidated porous media. The approach is to measure fluid permeability and electrical conductivity of rock samples using single and multiple fluid phases that can be frozen in place (wetting and nonwetting) over a range of pore pressures. These experiments are analyzed in terms of the microphysics and microchemistry of the processes involved to provide a theoretical basis for the macroscopic constitutive relationships between fluid-flow and geophysical properties that the authors develop. The purpose of these experiments and their analyses is to advance the understanding of the mechanisms and factors that control fluid transport in porous media. This understanding is important in characterizing porous media properties and heterogeneities before simulating and monitoring the progress of complex flow processes at the field scale in permeable media.

8648 (DOE/ER–0636) **Summaries of FY 1994 geosciences research.** USDOE Office of Energy Research, Washington, DC (United States). Engineering and Geosciences Div. Dec 1994. 170p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95005657. Source: OSTI; NTIS; GPO Dep.

The Geosciences Research Program is directed by the Department of Energy's (DOE's) Office of Energy Research (OER) through its Office of Basic Energy Sciences (OBES). Activities in the Geosciences Research Program are directed toward the long-term fundamental knowledge of the processes that transport, modify, concentrate, and emplace (1) the energy and mineral resources of the earth and (2) the energy byproducts of man. The Program is divided into five broad categories: Geophysics and earth dynamics; Geochemistry; Energy resource recognition, evaluation, and utilization; Hydrogeology and exogeochemistry; and Solar-terrestrial interactions. The summaries in this document, prepared by the investigators, describe the scope of the individual programs in these main areas and their subdivisions including earth dynamics, properties of earth materials, rock mechanics, underground imaging, rock-fluid interactions, continental scientific drilling, geochemical transport, solar/atmospheric physics, and modeling, with emphasis on the interdisciplinary areas.

8649 (DOE/ER/14081–T3) **Models of natural fracture connectivity – Implications for reservoir permeability. Final report.** Pollard, D.D.; Aydin, A. Stanford Univ., CA (United States). Dept. of Geological and Environmental Sciences. 14 Nov 1994. 24p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG03-89ER14081. Order Number DE95004702. Source: OSTI; NTIS; GPO Dep.

Fluid flow through fracture networks in a rock mass depends strongly on the nature of connections between fracture segments and between individual fractures. Therefore the objective of this research project is to develop three dimensional models for natural fracture connectivity using an integrated field, laboratory, and theoretical methodology. The geometric models the authors have developed are based on detailed field mapping and observations from outcrops of both massive and layered sedimentary rocks, typical of producing oil and gas reservoirs, or of aquifers. Furthermore, the have used computer simulations and laboratory experiments to investigate the physical mechanisms responsible for fracture connectivity (or lack thereof) as single and multiple sets of fractures evolve. The computer models are based on fracture mechanics principles and the laboratory experiments utilize layered composite materials analogous to sedimentary sequences. By identifying the physical mechanisms of connectivity they can relate the degree of connectivity to the geometry, state of stress, and material properties of the reservoir rocks and, in turn, be in a position to evaluate the influence of these factors on fracture permeability.

8650 (DOE/NV/10845–49) **Identification of potential groundwater flow paths using geological and geophysical data.** Pohlmann, K.; Andricevic, R. USDOE Economic Regulatory Administration, Washington, DC (United States). Office of Utility Systems. Sep 1994. 26p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC08-90NV10845. Order Number DE95006253. Source: OSTI; NTIS; INIS; GPO Dep.

This project represents the first phase in the development of a methodology for generating three-dimensional equiprobable maps of hydraulic conductivity for the Nevada Test Site (NTS). In this study, potential groundwater flow paths were investigated for subsurface tuffs at Yucca Flat by studying how these units are connected. The virtual absence of site-specific hydraulic conductivity data dictates that as a first step a surrogate attribute (geophysical logs) be utilized. In this first phase, the connectivity patterns of densely welded ash-flow tuffs were studied because these tuffs are the most likely to form zones of high hydraulic conductivity. Densely welded tuffs were identified based on the response shown on resistivity logs and this information was transformed into binary indicator values. The spatial correlation of the indicator data was estimated through geostatistical methods. Equiprobable three-dimensional

maps of the distribution of the densely-welded and nonwelded tuffs (i.e., subsurface heterogeneity) were then produced using a multiple indicator simulation formalism. The simulations demonstrate that resistivity logs are effective as soft data for indicating densely welded tuffs. The simulated welded tuffs reproduce the stratigraphic relationships of the welded tuffs observed in hydrogeologic cross sections, while incorporating the heterogeneity and anisotropy that is expected in this subsurface setting. Three-dimensional connectivity of the densely welded tuffs suggests potential groundwater flow paths with lengths easily over 1 km. The next phase of this investigation should incorporate other geophysical logs (e.g., gamma-gamma logs) and then calibrate the resulting soft data maps with available hard hydraulic conductivity data. The soft data maps can then augment the hard data to produce the final maps of the spatial distribution of hydraulic conductivity that can be used as input for numerical solution of groundwater flow and transport.

8651 (LBL–36126) **Analysis of in-situ rock joint strength using digital borehole scanner images.** Thapa, B.B. Lawrence Berkeley Lab., CA (United States). Sep 1994. 168p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00098. Order Number DE95004684. Source: OSTI; NTIS; GPO Dep.

The availability of high resolution digital images of borehole walls using the Borehole Scanner System has made it possible to develop new methods of in-situ rock characterization. This thesis addresses particularly new approaches to the characterization of in-situ joint strength arising from surface roughness. An image processing technique is used to extract the roughness profile from joints in the unrolled image of the borehole wall. A method for estimating in-situ Rengers envelopes using this data is presented along with results from using the method on joints in a borehole in porphyritic granite. Next, an analysis of the joint dilation angle anisotropy is described and applied to the porphyritic granite joints. The results indicate that the dilation angle of the joints studied are anisotropic at small scales and tend to reflect joint waviness as scale increases. A procedure to unroll the opposing roughness profiles to obtain a two dimensional sample is presented. The measurement of apertures during this process is shown to produce an error which increases with the dip of the joint. The two dimensional sample of opposing profiles is used in a new kinematic analysis of the joint shear stress-shear deformation behavior. Examples of applying these methods on the porphyritic granite joints are presented. The unrolled opposing profiles were used in a numerical simulation of a direct shear test using Discontinuous Deformation Analysis. Results were compared to laboratory test results using core samples containing the same joints. The simulated dilatancy and shear stress-shear deformation curves were close to the laboratory curves in the case of a joint in porphyritic granite.

8652 (NEI-NO–469) **Use of explicit finite-difference schemes and lateral open boundary conditions in numerical ocean models.** Engedahl, H. (Norwegian Meteorological Inst., Oslo (Norway)). Oslo Univ. (Norway). Dec 1992. 112p. Order Number DE95737637. Source: OSTI; NTIS.

The present study consists of two parts. Part 1 is the smallest. It considers the use of a special explicit finite difference scheme for the horizontal discretization in numerical models. The second and largest part of the study describes the implementation, testing and use of the Flow Relaxation Scheme (FRS) as lateral open boundary condition in numerical ocean models. The FRS was originally designed for use in atmospheric limited area models to relax external solutions from a large area model towards solutions in a limited area model, often with a finer horizontal grid resolution. Thus, the FRS acts as a one-way influence nesting technique. The FRS is applied as lateral open boundary condition in the operational atmospheric forecast model (LAM) at the Norwegian Meteorological Institute (DNMI). The first work describes the implementation and testing of the FRS in a barotropic ocean model with an idealized geometry. The second work studies the use of the FRS in a fully three-dimensional ocean model applied for a real topography covering the North East Atlantic, the Greenland and Norwegian Seas, the Barents Sea and the North Sea. In dealing with regional ocean models, proper open boundary conditions are a crucial factor for obtaining a satisfactory circulation. The problems regarding the treatment of open boundaries in numerical ocean models has been a subject of rather intense investigations and studies over the last years. No really general solution seems to have been obtained, and often a pragmatic approach has been taken in using whichever method works best in each given situation. However, the FRS has shown good performance in many different ocean settings such as simulation of tidal motions, storm surges, wind-driven and climatological circulations. Thus, it may be regarded as a possible candidate for a more unified treatment of lateral open boundaries in numerical ocean models. 46 refs., 47 figs., 1 tab.

8653 (UCRL-JC–116575) **A numerical prediction of the precipitation and hydrology of California.** Kim, J. (Lawrence Livermore National Lab., CA (United States)); Miller, N.; Soong, S.T.; Rhea, O. Lawrence Livermore National Lab., CA (United States). Aug 1994. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. (CONF-950124–3: 75. annual meeting of the American Meteorological Society: diamond anniversary, Dallas, TX (United States), 15-20 Jan 1995). Order Number DE95004966. Source: OSTI; NTIS; GPO Dep.

A five day simulation of the precipitation over the southwestern United States using a RNWHPS is presented. The MAS model accurately simulates the observed local precipitation, even though extreme values are somewhat underestimated. The precipitation at individual watersheds clearly indicates that the timing of local precipitation depends on the location of each watershed and the direction of the storm path.

66 PHYSICS

8654 (DOE/ER/75642–T2) **SciTech Clubs for Girls. [Final report], September 1, 1991–April 30, 1994.** Malamud, E.; Diaz, O.; Cox, J. SciTech, Inc., Aurora, IL (United States). [1994]. 20p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-91ER75642. Order Number DE95005782. Source: OSTI; NTIS; GPO Dep.

The program of SciTech Clubs for Girls and its progress are described. This is a program that promotes the learning of science and mathematics by girls in the age range of 9 to 13 years through the process of building exhibits and learning from local professionals. A list of exhibits and a critique of the program are given.

6610 General Physics

8655 (INIS-mf–14440) **Abstracts of annual physics conference of Iran 1373, Kordestan University, Sanandaj, 19 Aug - 1 Sep 1994.** Mirzabeygui, Jahanshah (ed.). Iranian Physics Society, Teheran (Iran, Islamic Republic of). Aug 1994. 91p. (In English, Persian). (CONF-9408203–: Annual physics conference of Iran, Sanandaj (Iran, Islamic Republic of), 19 Aug - 1 sep 1994). Order Number DE95611717. Source: OSTI; NTIS (US Sales Only); INIS.

Collection of separate abstracts written in the proceedings of Annual Physics Conference of Iran,1373 covered following topics: Mathematical methods in physics, relativity and gravitation; The physics of elementary particles; Nuclear physics and nuclear engineering; Atomic and molecular physics, optics and magnetism; Fluids, plasma, and electric discharges; Condensed matter; Astronomy and astrophysics.

8656 (JINR-D–2-94-244) **The Radiation Conditioned by the 'Velocity Part' of the Electromagnetic Field of a Moving Charge.** Strel'tsov, V.N. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of High Energy. 1994. 4p. Order Number DE95613366. Source: OSTI; NTIS (US Sales Only); INIS.

The Cherenkov radiation, the transition radiation and the radiation in gas below the Cherenkov threshold are considered as varieties of one phenomenon. This (non breaking) radiation is conditioned by the 'velocity part of the electromagnetic field of a relativistic charge. The forward direction of the radiation reflects the corresponding direction of the field (its retarded strengths). (author). 15 refs.

8657 (JINR-E–2-94-246) **The Conical Singularity and Quantum Corrections to Entropy of Black Hole.** Solodukhin, S.N. Joint Inst. for Nuclear Research, Dubna (Russian Federation).

Lab. of Theoretical Physics. 1994. 22p. Order Number DE95613367. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Physical Review. D, Particles Fields.

It is well known that at the temperature different from the Hawking temperature there appears a conical singularity in the Euclidean classical solution of gravitational equations. The method of regularizing the cone by regular surface is used to determine the curvature tensors for such metrics. It allows to calculate the one-loop matter effective action and the corresponding one-loop quantum corrections to the entropy in the framework of the path integral approach of Gibbons and Hawking. The two-dimensional and four-dimensional cases are considered. The entropy of the Rindler space is shown to be divergent logarithmically in two dimensions and quadratically in four dimensions. It corresponds to the results obtained earlier. For the eternal 2D black hole we observe finite, dependent on the mass, correction to the entropy. The entropy of the 4D Schwarzschild black hole is shown to possess an additional (in comparison to the 4D Rindler space) logarithmically divergent correction which does not vanish in the limit of infinite mass of the black hole. We argue that infinities of the entropy in four dimensions are renormalized with the renormalization of the gravitational coupling. (author). 35 refs.

8658 (JINR-R–2-94-222) **Einstein's Length Concept.** Khvastunov, M.S. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of High Energy. 1994. 7p. (In Russian). Order Number DE95613368. Source: OSTI; NTIS (US Sales Only); INIS.

Einstein's length measuring procedure of a rod moving with velocity v ($0 \leq |v| < c$) is discussed. The part of this procedure, namely measuring the length of the resting ($v = 0$) rod, is realizable and leads to the elongation of the moving rod. The other part of Einstein's procedure, measuring the length of the moving ($v \neq 0$) rod, is not realizable and leads to the contraction of the moving rod. As the result of this procedure the moving rod contraction concept is supposed physically unfounded. (author). 8 refs; 1 fig.

8659 (JINR-R–2-94-223) **Simultaneity and Length of the Moving Rod.** Khvastunov, M.S. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of High Energy. 1994. 7p. (In Russian). Order Number DE95613369. Source: OSTI; NTIS (US Sales Only); INIS.

Einstein's length measuring procedure of a rod moving with velocity v ($0 \leq |v| < c$) is discussed. The part of this procedure, namely measuring the length of the resting ($v = 0$) rod, leads to the elongation of the moving rod and agrees with Einstein's simultaneity concept. The other part of Einstein's procedure measuring the length of the moving ($v \neq 0$) rod leads to the contraction of the moving rod and is at variance with the simultaneity concept. (author). 10 refs.

6611 Classical and Quantum Mechanics

Refer also to citation(s) 8695, 8715, 8718, 9040, 9047

8660 (BUDKERINP–93-94) **Statistical properties of chaotic scattering with one open channel.** Izrajlev, F.M.; Saher, D.; Sokolov, V.V. AN SSSR, Novosibirsk (Russian Federation). Inst. Yadernoj Fiziki. 1993. 23p. (IYaF–93-94.). Order Number DE95613370. Source: OSTI; NTIS (US Sales Only); INIS.

The correspondence between statistical properties of decaying states and fluctuations in resonance scattering is studied in a statistical model with one open channel. The model is described by an ensemble of random nonhermitian matrices. The dependence of the correlation length on the coupling parameter both for the S-matrix and the cross-section is studied numerically. 37 refs., 7 figs.

8661 (IA–1486, pp. 6) **Application of square integrable basis functions for scattering problems. A comparison between approaches based on Toeplitz matrices and negative imaginary potentials.** Ron, S.; Eisenberg, E.; Gilibert, M.; Baer, M. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993*. 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. POTENTIAL SCATTERING/quantum mechanics; COORDINATES; MATRICES; S MATRIX

8662 (IA–1486, pp. 13) **Radiation transport and coherence in amplifying refractive systems.** Hazak, G.; Zahavi, O. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993*. 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. X-RAY LASERS/radiant heat transfer; AMPLIFICATION; COHERENT RADIATION; RADIATORS; REFRACTION; SPATIAL DISTRIBUTION; STATISTICAL MODELS; STOCHASTIC COOLING; WAVE EQUATIONS

8663 (IA–1486, pp. 13) **Study of amplified spontaneous emission systems by ray-tracing technique.** Zahavi, O.; Hazak, G.; Zinamon, Z. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993*. 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. X-RAY LASERS/superradiance; ANALYTICAL SOLUTION; NUMERICAL SOLUTION; OPTICAL DISPERSION; REFRACTION; SPATIAL DOSE DISTRIBUTIONS; SUPERRADIANCE

8664 (IA–1486, pp. 14) **Generalized Van Cittert Zernike theorem in curved space time.** Hazak, G.; Zamir, R. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993*. 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. COHERENT RADIATION/wave propagation; GRAVITATIONAL LENSES; MATHEMATICAL MODELS; QUASARS; RADIATION SOURCES; SPACE-TIME

8665 (IA–1486, pp. 14) **The Wolf effect in spherically symmetric systems.** Hazak, G.; Zamir, R. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993*. 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. COHERENT RADIATION/wave propagation; ANALYTICAL SOLUTION; EMISSION SPECTRA; FLUX DENSITY; ISOTROPY; RADIATION FLUX; SPHERICAL CONFIGURATION

8666 (IC–93/366) **Bifurcations of contracting singular cycles.** Labarca, R. International Centre for Theoretical Physics, Trieste (Italy). Aug 1994. 44p. Order Number DE95613371. Source: OSTI; NTIS (US Sales Only); INIS.

The aim of this work is to continue the analysis of a new mechanism, the singular cycles, through which a vector field, depending on parameters, may evolve when the parameter varies from a vector field exhibiting simple dynamics into one having non-trivial dynamics. (author). 8 refs, 4 figs.

8667 (IC–94/188) **Method of normal coordinates in the formulation of a system with dissipation: The harmonic oscillator.** Mshelia, E.D. International Centre for Theoretical Physics, Trieste (Italy). Jul 1994. 13p. Order Number DE95613372. Source: OSTI; NTIS (US Sales Only); INIS.

The method of normal coordinates of the theory of vibrations is used in decoupling the motion of n oscillators ($1 \leq n \leq 4$) representing intrinsic degrees of freedom coupled to collective motion in a quantum mechanical model that allows the determination of the probability for energy transfer from collective to intrinsic excitations in a dissipative system. (author). 21 refs.

8668 (IC–94/266) **Maximum principle for subsolutions of degenerate elliptic operators.** Ramaswamy, M. (T.I.F.R. Center, Bangalore (India). School of Mathematics); Ramaswamy, S. International Centre for Theoretical Physics, Trieste (Italy). Sep 1994. 10p. Order Number DE95613373. Source: OSTI; NTIS (US Sales Only); INIS.

The maximum principle for classical and viscosity subsolutions of a general degenerate elliptic linear second order operator with second and first order terms alone on bounded open subsets is proved under various assumptions on the coefficients. A general sufficient condition is given when the coefficients are continuous. A counter example is also given to show that the maximum principle is not valid even for classical subsolutions of degenerate elliptic operators in general. (author). 3 refs.

8669 (IC–94/268) **Newton Raphson method, scaling at fractal boundaries and Mathematica.** Ajay Kumar Bisoi. International Centre for Theoretical Physics, Trieste (Italy). Sep 1994. 19p. Order Number DE95613374. Source: OSTI; NTIS (US Sales Only); INIS.

The basins of convergence of cubic polynomials having real roots are studied using Newton Raphson iterative method. The limiting value for the ratio of basin segments for equispaced roots is explained. An algorithm is presented for computing the basin boundaries on the real axis which obviates the necessity of taking recourse to extensive search. Mathematica programs have been developed to help in the above study and also to depict the basins in the complex plane. (author). 10 refs, 5 figs.

8670 (IC–94/279) **Tracing a planar algebraic curve.** Chen Falai (University of Science and Technology of China, Hefei, Anhui (China). Dept. of Mathematics); Feng Yuyu; Kozak, J. International Centre for Theoretical Physics, Trieste (Italy). Sep 1994. 15p. Order Number DE95613375. Source: OSTI; NTIS (US Sales Only); INIS.

In this paper, an algorithm that determines a real algebraic curve is outlined. Its basic step is to divide the plane into subdomains that include only simple branches of the algebraic curve without singular points. Each of the branches is then stably and efficiently traced in the particular subdomain. Except for the tracing, the algorithm requires only a couple of simple operations on polynomials that can be carried out exactly if the coefficients are rational, and the determination of zeros of several polynomials of one variable. (author). 5 refs, 4 figs.

8671 (IC–94/281) **On quantization of self-similar systems.** Altaisky, M.V. International Centre for Theoretical Physics, Trieste (Italy). Sep 1994. 11p. Order Number DE95613376. Source: OSTI; NTIS (US Sales Only); INIS.

Assuming the hypothesis that self-similarity is an immanent matter property, rather than a purely theoretical tool for cutting divergencies, I extend the toy-model of quantum harmonic oscillator to a self-similar one. (author). 12 refs.

8672 (IC–94/300) **Around Ratner.** Starkov, A.N. International Centre for Theoretical Physics, Trieste (Italy). Oct 1994. 17p. Order Number DE95613377. Source: OSTI; NTIS (US Sales Only); INIS.

In this paper we demonstrate how Ratner's fundamental results on unipotent homogeneous actions can be applied to the study of general homogeneous actions. We consider such questions as the structure of orbits and minimal sets, multiple mixing, and measure isomorphisms of one parameter homogeneous flows. (author). 47 refs.

8673 (IC–94/314) **Exact smooth classification of Hamiltonian vector fields on symplectic 2-manifolds.** Krouglikov, B.S. International Centre for Theoretical Physics, Trieste (Italy). Oct 1994. 20p. Order Number DE95613378. Source: OSTI; NTIS (US Sales Only); INIS.

Complete exact classification of Hamiltonian systems with one degree of freedom and Morse Hamiltonian is carried out. As it is a main part of trajectory classification of integrable Hamiltonian systems with two degrees of freedom, the corresponding generalization is considered. The dual problem of classification of symplectic form together with Morse foliation is carried out as well. (author). 10 refs, 16 figs.

8674 (IC–94/318) **The iteration formula of the Maslov-type index theory with applications to nonlinear Hamiltonian systems.** Di Dong (Nankai Univ., Tianjin (China). Inst. of Mathematics); Yiming Long. International Centre for Theoretical Physics, Trieste (Italy). Oct 1994. 81p. Order Number DE95613379. Source: OSTI; NTIS (US Sales Only); INIS.

In this paper, the iteration formula of the Maslov-type index theory for linear Hamiltonian systems with continuous periodic and symmetric coefficients is established. This formula yields a new method to determine the minimality of the period for solutions of nonlinear autonomous Hamiltonian systems via their Maslov-type indices. Applications of this formula give new results on the existence of periodic solutions with prescribed minimal period for such systems. (author). 40 refs.

8675 (IC–94/324) **Dressing symmetry of the uniformization solution of Liouville equation.** Shen Jianmin. International Centre for Theoretical Physics, Trieste (Italy). Oct 1994. 15p. Order Number DE95613380. Source: OSTI; NTIS (US Sales Only); INIS.

In this paper, the relations between monodromy group and dressing group for Liouville equation in uniformization theorem are discussed. The representation of monodromy transformation, acting on the chiral components of the solution of Liouville equation, is obtained. The non-trivial exchange algebra for monodromy transformation is calculated. (author). 14 refs.

8676 (IC–94/332) **Study of the generalized solutions of n-body type problems with weak forces.** Riahi, H. International Centre for Theoretical Physics, Trieste (Italy). Oct 1994. 15p. Order Number DE95613381. Source: OSTI; NTIS (US Sales Only); INIS.

We show that the generalized solutions of n-body type problems with weak forces, in R^l, obtained as limits of classical solutions of problems with strong force potentials, have at most a finite number of collisions if $l \geq 2(n-2) + 1$. We also estimate the number of collisions using the Morse index of the approximated solutions when $l \geq 2(n - 1) + 1$ and in particular, we show the existence of a non-collision solution in the case of a symmetrical potential and $l \geq 2(n - 1) + 1$. (author). 13 refs.

8677 (IC–94/341) **Generalized Kummer surfaces and differentiable invariants of Noether-Horikawa surfaces 1.** Catanese, F. International Centre for Theoretical Physics, Trieste (Italy). Nov 1994. 55p. Contract SCI-0398-C(A). Order Number DE95613382. Source: OSTI; NTIS (US Sales Only); INIS.

The moduli spaces M of surfaces of general type with a fixed topological type are known to have several connected components: there is a map π_0 (M) $\rightarrow$ Diff, where Diff is the set of differentiable types of 4-manifolds. The unsolved question is whether this map is injective or not. The simplest surfaces of general type for which the moduli space is known to be disconnected are the so called Noether-Horikawa surfaces, for which one should try to calculate the Donaldson differentiable invariants. 28 refs.

8678 (IC–94/344) **On the degree of approximation by Jackson type operators.** Khan, H.H. International Centre for Theoretical Physics, Trieste (Italy). Oct 1994. 4p. Order Number DE95613383. Source: OSTI; NTIS (US Sales Only); INIS.

In the present paper we obtained the degree of approximation of functions belonging to newly defined class Lip (ψ(u,v);p), $p > 1$ using the Jackson type operators of the double Fourier series of f(x,y). (author). 3 refs.

8679 (JINR-E–2-94-249) **Elliptic Deformed Classical Mechanics in Three-Dimensional Phase Space.** Yamaleev, R.M. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Computing Techniques and Automation. 1994. 10p. Order Number DE95613384. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Proceedings of the Conference on Dynamical Systems and Chaos, Tokyo, May 23-27, 1994.

We suggest the new way of introduction into three-dimensional phase space. Our approach is based on the elliptic deformation of two-dimensional phase space. This kind of deformation we call 'elliptic' because oscillator of deformed mechanics is described by the Jacobi elliptic functions. The theory contains a parameter μ of energy dimensionality, so that for $\mu \rightarrow \infty$ the deformed dynamics is reduced to the Newton equations. The quasiclassical way of quantization is considered. 8 refs.

8680 (JINR-E–5-94-259) **Removal of the Energy Dependence from the Resolvent Like Energy Dependent Interactions.** Motovilov, A.K. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1994. 20p. Order Number DE95613385. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Teoreticheskaya i Matematicheskaya Fizika.

The spectral problem $(A + V(z))\psi = z\psi$ is considered where main Hamiltonian A is a self-adjoint operator of sufficiently arbitrary nature. The perturbation $V(z) = -B(A'-z)^{-1} B^*$ depends on the energy z as resolvent of another self-adjoint operator A'. The latter is usually interpreted as Hamiltonian describing an internal structure of physical system. The operator B is assumed to have a finite Hilbert-Schmidt norm. The conditions are formulated when one can

replace the perturbation V(z) with an energy independent 'potential' W such that the Hamiltonian H = A + W has the same spectrum (more exactly a part of spectrum) and the same eigenfunctions as the initial spectral problem. The Hamiltonian H is constructed as a solution of the non-linear operator equation H = A + V(H). It is established that this equation is closely connected with the problem of searching for invariant subspaces for the Hamiltonian H = A_B* B_A'. The orthogonality and expansion theorems are proved for eigenfunction systems of the Hamiltonian H = A+W. Scattering theory is developed for this Hamiltonian in the case when operator A has continuous spectrum. (author). 26 refs.

8681 (LA-UR–94-4386) **Complex scattering dynamics and the quantum Hall effects.** Trugman, S.A. Los Alamos National Lab., NM (United States). 16 Dec 1994. 31p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9405204–3: Quantum complexity in mesoscopic systems, Los Alamos, NM (United States), 16-20 May 1994). Order Number DE95005239. Source: OSTI; NTIS; INIS; GPO Dep.

We review both classical and quantum potential scattering in two dimensions in a magnetic field, with applications to the quantum Hall effect. Classical scattering is complex, due to the approach of scattering states to an infinite number of dynamically bound states. Quantum scattering follows the classical behavior rather closely, exhibiting sharp resonances in place of the classical bound states. Extended scatterers provide a quantitative explanation for the breakdown of the QHE at a comparatively small Hall voltage as seen by Kawaji et al., and possibly for noise effects.

8682 (SLAC-PUB–6718) **Decoherence, determinism and chaos revisited.** Noyes, H.P. Stanford Linear Accelerator Center, Menlo Park, CA (United States). 15 Nov 1994. 18p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-9407158–1: Law and prediction in natural science in the light of new knowledge from chaos research, Salzburg (Austria), 7-10 Jul 1994). Order Number DE95006070. Source: OSTI; NTIS; INIS; GPO Dep.

We suggest that the derivation of the free space Maxwell Equations for classical electromagnetism, using a discrete ordered calculus developed by L.H. Kauffman and T. Etter, necessarily pushes the discussion of determinism in natural science down to the level of relativistic quantum mechanics and hence renders the mathematical phenomena studied in deterministic chaos research irrelevant to the question of whether the world investigated by physics is deterministic. We believe that this argument reinforces Suppes' contention that the issue of determinism versus indeterminism should be viewed as a Kantian antinomy incapable of investigation using currently available scientific tools.

8683 (UM-P–92/84) **Associators in generalized octonionic maps.** Griffin, C.J.; Joshi, G.C. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 13p. Order Number DE95616243. Source: OSTI; NTIS (US Sales Only); INIS.

Generalizing previous work, it is shown that structural transitions are a general property of a large class of octonionic maps. They can thus be used as an indicator of non-associativity in an octonionic map. 7 refs., ills.

8684 (UM-P–94/09) **Interferometry with particles of non-zero rest mass: topological experiments.** Opat, G.I. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 27p. Order Number DE95616244. Source: OSTI; NTIS (US Sales Only); INIS.

Interferometry as a space-time process is described, together with its topology. Starting from this viewpoint, a convenient unified formalism for the phase shifts which arise in particle interferometry is developed. This formalism is based on a covariant form of Hamilton's action principle and Lagrange's equations of motion. It will be shown that this Lorentz invariant formalism yields a simple perturbation theoretic expression for the general phase shift that arises in matter-wave interferometry. The Lagrangian formalism is compared with the more usual formalism based on the wave propagation vector and frequency. The resulting formalism will be used to analyse the Sagnac effect, gravitational field measurements, and several Aharonov-Bohm-like topological phase shifts. Several topological interferometric experiments using particles of non-zero rest mass are discussed. These experiments involve the use of electrons, neutrons and neutral atoms. Neutron experiments will be emphasised. 45 refs., 15 figs.

6612 Techniques of General Use In Physics

Refer also to citation(s) 8250, 9012, 9164

8685 (IYaF–93-49) **Spectroscopic measurements of plasma parameters of planotron and Penning H^- ion source discharges.** Antsiferov, V.V. AN SSSR, Novosibirsk (Russian Federation). Inst. Yadernoj Fiziki. 1993. 23p. (In Russian). Order Number DE95613433. Source: OSTI; NTIS (US Sales Only); INIS.

Plasma of glow hydrogen-cesium discharges of planotron and Penning types by spectroscopic methods is investigated. Element and charge plasma composition is determined. The hydrogen atom temperature is measured and the electron density in the plasma is estimated. Variation of the hydrogen, cesium and molybdenum (electrode material) atom densities and cesium ion density is detected during a discharge pulse with two-dimensional spatial resolution. It is found trapping cesium atom and ions and molybdenum atoms near the cathode surface. The discharge plasma emission energy in the visible range of spectra is measured. 8 refs., 13 figs.

8686 (UM-P–94/60) **Magneto-optical transmission-reflection beam splitter for multi-level atoms.** Murphy, J.E.; Goodman, P.; Sidorov, A.I. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 18p. Order Number DE95616267. Source: OSTI; NTIS (US Sales Only); INIS.

An atomic de Broglie wave beam splitter is proposed. The interaction of multi-level atoms ($J_g = 1 - J_e = 0$) with a laser beam in the presence of a static magnetic field leads to the partial transmission and reflection of the atomic beam. The coherent splitting of the atomic beam occurs due to non-adiabatic transitions between different dressed states in the vicinity of avoided crossings. The transition probabilities and populations of split beams are dependent on the value of the magnetic field, laser detuning, and the ratio between different polarization components in the laser beam. For optimal conditions the population of each of the two transmitted and two reflected beams is 25 per cent. For cooled atoms it is possible to obtain splitting angles of 80 mrad. The effect of spontaneous emission during the atom-light interaction was estimated and for a reasonable detuning losses were reduced to less than 10 per cent. 14 refs., 1 tab., 6 figs.

6613 Other Aspects of Physical Science

Refer also to citation(s) 8844, 8995

8687 (BUDKERINP–94-53) **Instability of weakly nonlinear chaotic structures.** Vecheslavov, V.V. AN SSSR, Novosibirsk (Russian Federation). Inst. Yadernoj Fiziki. 1994. 9p. (IYaF–94-53.). Order Number DE95613441. Source: OSTI; NTIS (US Sales Only); INIS.

A linear oscillator driven by periodic perturbation is considered. The infinite connected chaotic structures in phase plane emerge when the perturbation is of the form of the periodic δ-function and the exact resonance condition is fulfilled. These structures are shown to be unstable and completely destroyed if the duration of the perturbation kick is arbitrarily short but finite. 7 refs., 3 figs.

8688 (DOE/ER/40561–164) **Landau-Zener treatments of solar neutrino oscillations.** Bruggen, M. (Cambridge Univ. (United Kingdom). Dept. of Physics); Haxton, W.C.; Qian, Y.Z. Washington Univ., Seattle, WA (United States). [1995]. 21p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG06-90ER40561. Order Number DE95004761. Source: OSTI; NTIS; GPO Dep.

The authors present a simple derivation of Landau-Zener formulae for nonadiabatic level crossings for linear and exponential density profiles. The derivation depends on a single assumption that applies somewhat differently to the exponential and linear cases, providing some insight into the relationship between the respective formulae. They note that one exponential Landau-Zener formula in common use is only approximately correct. Comparisons with exact calculations are made.

8689 (FNAL/C–94/373) **A survey of surveys.** Kent, S.M. Fermi National Accelerator Lab., Batavia, IL (United States). Nov 1994. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH03000. (CONF-9408198–1: IAU169 conference on unsolved problems of the milky way, The Hague (Netherlands), 23-27 Aug 1994). Order Number DE95004238. Source: OSTI; NTIS; INIS; GPO Dep.

A new era for the field of Galactic structure is about to be opened with the advent of wide-area digital sky surveys. In this article, the author reviews the status and prospects for research for 3 new ground-based surveys: the Sloan Digital Sky Survey (SDSS), the Deep Near-Infrared Survey of the Southern Sky (DENIS) and the Two Micron AU Sky Survey (2MASS). These surveys will permit detailed studies of Galactic structure and stellar populations in the Galaxy with unprecedented detail. Extracting the information, however, will be challenging.

8690 (FNAL/C–94/397) **A generic data exchange scheme between FITS format and C structures.** Wei Peng; Nicinski, T. Fermi National Accelerator Lab., Batavia, IL (United States). Nov 1994. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH03000. (CONF-9409280–1: Astronomical data acquisition software system conference, Baltimore, MD (United States), 25-28 Sep 1994). Order Number DE95004849. Source: OSTI; NTIS; GPO Dep.

A flexible and efficient scheme allowing arbitrary FITS Binary and ASCII Tables to be converted to arbitrary C structures at runtime is presented. This scheme has been successfully implemented and used with Shiva (Survey Human Interface and Visualization Environment), a package developed by Fermilab for the analysis of Sloan Digital Sky Survey data.

8691 (IA–1486, pp. 7) **Onsager-molecule approach to screening potentials in strongly coupled plasmas.** Rosenfeld, Y. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993*. 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. PLASMA/onsager relations; COULOMB FIELD; IDEAL FLOW; INTEGRAL EQUATIONS; NUCLEAR SCREENING; PLASMA; POTENTIAL ENERGY; YUKAWA POTENTIAL

8692 (IA–1486, pp. 8) **Adiabatic pair potential for charged particulates in plasma and electrolytes.** Rosenfeld, Y. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993*. 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. COLLOIDS/thermodynamics; PLASMA/thermodynamics; ADIABATIC PROCESSES; CHARGED PARTICLES; COLLOIDS; THERMODYNAMICS; IONS; MULTICHARGED IONS; NUCLEAR MOLECULES; PLASMA

8693 (IC–94/273) **Preservation theorems on finite structures.** Hebert, M. International Centre for Theoretical Physics, Trieste (Italy). Sep 1994. 7p. Order Number DE95613442. Source: OSTI; NTIS (US Sales Only); INIS.

This paper concerns classical Preservation results applied to finite structures. We consider binary relations for which a strong form of preservation theorem (called strong interpolation) exists in the usual case. This includes most classical cases: embeddings, extensions, homomorphisms into and onto, sandwiches, etc. We establish necessary and sufficient syntactic conditions for the preservation theorems for sentences and for theories to hold in the restricted context of finite structures. We deduce that for all relations above, the restricted theorem for theories hold provided the language is finite. For the sentences the restricted version fails in most cases; in fact the "homomorphism into" case seems to be the only possible one, but the efforts to show that have failed. We hope our results may help to solve this frustrating problem; in the meantime, they are used to put a lower bound on the level of complexity of potential counterexamples. (author). 8 refs.

8694 (IC–94/284) **Electron-optical nonlinear interaction in asymmetric quantum-well laser heterostructures.** Kononenko, V.K. (International Centre for Theoretical Physics, Trieste (Italy)); Afonenko, A.A.; Manak, I.S. International Centre for Theoretical Physics, Trieste (Italy). Sep 1994. 10p. Order Number DE95613443. Source: OSTI; NTIS (US Sales Only); INIS.

The effects of nonlinear electron-optical interaction between two quantum wells in the active region of low-dimensional lasers with inhomogeneous excitation are discussed. The conditions for realizing bistable behaviour of optical output and self-sustained pulsations of radiation at two optical wavelengths are determined. The influence of current carrier leakage on the hard regime of lasing is considered. The synchronization effect of coupled well modulation of injection on pulse generation has been predicted. Analysis based on rate equations has been performed for the GaAs - $Al_xGa_{1-x}As$ system. (author). 5 refs, 4 figs.

8695 (IC–94/296) **Generalized deformed para-Bose oscillator and its coherent states.** Ha Huy Bang. International Centre for Theoretical Physics, Trieste (Italy). Sep 1994. 11p. Grant KT04-3.1.18. Order Number DE95613444. Source: OSTI; NTIS (US Sales Only); INIS.

Generalized deformed commutation relations for a single mode para-Bose oscillator are constructed. The connection of generalized deformed para-Bose oscillators with para-Bose oscillators is determined. From these, the energy spectrum of generalized deformed para-Bose oscillators and the coherent states of the annihilation operators are discussed. (author). 25 refs.

8696 (IC–94/298) **Acoustomagnetoelectric effect in a superlattice.** Mensah, S.Y. (International Centre for Theoretical Physics, Trieste (Italy)); Allotey, F.K.A.; Adjepong, S.K. International Centre for Theoretical Physics, Trieste (Italy). Sep 1994. 9p. Order Number DE95613445. Source: OSTI; NTIS (US Sales Only); INIS.

The acoustomagnetoelectric effect (AME) in a semiconductor superlattice (SL) has been studied for an acoustic wave in the region $ql >> 1$. The expression for the acoustomagnetoelectric current j^{AME} was calculated in the τ = constant approximation. The result indicates that the existence of j^{AME} in SL may be due to the finite gap band and the periodicity of the electron spectrum. It is shown, in particular, that when $\omega_q > \Delta$ and $\Delta >> T$ (ω_q is the frequency of the acoustic phonons; 2Δ is the miniband width of SL and T is the temperature measured in energy unit) the SL behaves as a monopolar semiconductor bulk material and in that case $j^{AME} \rightarrow 0$. (author). 10 refs.

8697 (IC–94/301) **Bifurcations and chaos of DNA solitonic dynamics.** Gonzalez, J.A. (International Centre for Theoretical Physics, Trieste (Italy)); Martin-Landrove, M.; Carbo, J.R.; Chacon, M. International Centre for Theoretical Physics, Trieste (Italy). Sep 1994. 31p. Order Number DE95613446. Source: OSTI; NTIS (US Sales Only); INIS.

We investigated the nonlinear DNA torsional equations proposed by Yakushevich in the presence of damping and external torques. Analytical expressions for some solutions are obtained in the case of the isolated chain. Special attention is paid to the stability of the solutions and the range of soliton interaction in the general case. The bifurcation analysis is performed and prediction of chaos is obtained for some set of parameters. Some biological implications are suggested. (author). 11 refs, 13 figs.

8698 (IC–94/320) **A Monte-Carlo model of ionic transport across a solid interface.** Nachev, I.S. International Centre for Theoretical Physics, Trieste (Italy). Oct 1994. 17p. Order Number DE95613447. Source: OSTI; NTIS (US Sales Only); INIS.

An improved Monte-Carlo model of ionic transport across a solid interface in two-dimensional triangular lattice is presented. The new features of the model are: (i) more-realistic form of the microscopic potential of the ion-ion interaction, and (ii) accounting of the mutual ion interactions up to second nearest neighbors. This way it is possible to simulate more flexible the ionic transport across the real interface between a fast-ion conducting glass and the intercalate in the cathode of a Lithium thin-film battery. Numerical results computed with this model are presented by emphasizing on the influence of the internal interface on the ion distribution, the site energies and the open circuit voltage. (author). 15 refs, 5 figs.

8699 (IC–94/330) **New Fermi-liquid approach for the theory of disordered magnetics.** Kovalevsky, M.Yu. (International

Centre for Theoretical Physics, Trieste (Italy)); Rozhkov, A.A. International Centre for Theoretical Physics, Trieste (Italy). Oct 1994. 17p. Order Number DE95613448. Source: OSTI; NTIS (US Sales Only); INIS.

Hydro- and thermodynamics of disordered magnetics are derived in the framework of Fermi-liquid approach. The spectra of free oscillations with and without external magnetic field are obtained and analysed. Low-frequency asymptotics of the Green function are calculated with a homogeneous magnetic field applied. The singularities of the basic Green functions are considered. (author). 18 refs.

8700 (IC–94/331) **Effect of rouleaux size of erythrocyte on blood viscosity.** Chen Jinyu (International Centre for Theoretical Physics, Trieste (Italy)); Huang Zuqia. International Centre for Theoretical Physics, Trieste (Italy). Oct 1994. 12p. Order Number DE95613449. Source: OSTI; NTIS (US Sales Only); INIS.

In this paper, the rouleaux size dependence of viscosity in concentrated red blood cell suspension is derived analytically, by using reversible kinetic equation of coagulation, to reveal the effect of erythrocyte aggregation on the blood viscosity. In the limit of dilute concentration and low shear rate, the result does not reduce to Casson's equation. In the end we argue Murata's result on the shear rate dependence of viscosity. (author). 8 refs, 5 figs.

8701 (INIS-mf–14440, pp. 3) **Grand canonical potential of the anyon gas.** Azakov, S. (Inst. for Advanced Studies in Basic Science, Zanjan (Iran, Islamic Republic of)); Namiraniyan, A.; Haghighat, M. Iranian Physics Society, Teheran (Iran, Islamic Republic of); Isfahan Univ. (Iran, Islamic Republic of). Dept. of Physics. Aug 1994. 91p. (In English, Persian). (CONF-9408203–: Annual physics conference of Iran, Sanandaj (Iran, Islamic Republic of), 19 Aug - 1 sep 1994). In *Abstracts of annual physics conference of Iran, 1373 Kordestan University.* Order Number DE95611717. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. ANYONS/potentials; ANYONS; POTENTIALS; MAGNETIC FIELDS; SECOND QUANTIZATION

8702 (KAERI/RR–1234/92) **The development of laser technology.** Kim, Chul Jung (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Lee, Jong Min; Cha, Byung Heon; Kim, Jung Bog; Lim, Chang Hwan; Ko, Do Kyung; Lee, Byung Chul; Choi, Hwa Lim; Nam, Sung Mo; Kim, Sung Ho; Kim, Sung Oog; Shin, Jang Soo; Chung, ChKorea Cancer Center Hospital, Seoul (Korea, Republic of). Jun 1993. 102p. (In Korean). Order Number DE95613450. Source: OSTI; NTIS; INIS.

The objective of this project is the 'Development of Laser Technology' for the use of nuclear facilities. For the last first year, a 1kW-class Nd:YAG laser materials processing system has been assembled and laser sleeve welding related materials have been analyzed. Furthermore, laser metrology for the fast and accurate inspection of defects in steam generator U-tube has been also constructed and 5W high-resolution tunable dye laser, which is pumped by CVL, has been developed for applying to atomic spectroscopy technique development. A millimeter-wave free electron laser (FEL) system using an electrostatic accelerator has been designed and A one-dimensional simulation code has been developed to expect the gain of FEL. (Author).

8703 (LA-UR–94-4196) **The influence of CDM on the dynamical estimate of Ω in the local neighborhood.** Dunn, A.M. (Cambridge Univ. (United Kingdom). Inst. of Astronomy); Laflamme, R. Los Alamos National Lab., NM (United States). [1994]. 5p. Sponsored by National Aeronautics and Space Administration, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9410287–3: 5. astrophysics conference, College Park, MD (United States), 10-12 Oct 1994). Order Number DE95005212. Source: OSTI; NTIS; GPO Dep.

Peebles has suggested an interesting method to trace back in time positions of galaxies called the least action method. This method applied on the Local Group galaxies seems to indicate that we live in an $\Omega \approx 0.1$ Universe. We have studied a CDM N-body simulation with $\Omega = 0.2$ and $H = 50 kms^{-1}/Mpc$ and compare trajectories traced back from the Least Action Principle and the center of mass of the particle forming CDM halos. We have shown that the agreement between these set of trajectories is at best qualitative. We have also shown that the line of sight peculiar velocities are underestimated. This discrepancy is due to orphans, CDM particles which do not end up in halos. By varying the density parameter Ω in the least action principle we show that using this method we would underestimate the density of the Universe by a factor of 4–5.

8704 (LA-UR–94-4318) **Statistical mechanics of nonlinear coherent structures: Kinks in the Φ^6 model.** Habib, S.; Saxena, A. Los Alamos National Lab., NM (United States). [1994]. 13p. Sponsored by Department of Defense, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9409241–7: NEEDS '94, Los Alamos, NM (United States), 12-16 Sep 1994). Order Number DE95005253. Source: OSTI; NTIS; GPO Dep.

We study the thermodynamics of kinks in the Φ^6 model using a Langevin code implemented on a massively parallel computer. This code can be used to study first order dynamical phase transitions which exhibit multiple length and time scales. The classical statistical mechanics of a 1 + 1-dimensional field theory reduces to a time-independent quantum problem in one dimension via the transfer integral method. Exact solutions of the Schroedinger equation exist for the Φ^6 potential (unlike the case for Φ^4) and can be used to check results from the simulations. The Φ^6 model is also much richer than the Φ^4 model in terms of the variety of coherent structures and possible phases accompanying a phase transition. Specifically, we have calculated (in a one dimensional model) such quantities as the probability density function (PDF) and field-field correlation functions. These quantities help us understand the contribution to the specific heat from coherent structures such as domain walls (kinks) and other transformation structures as opposed to the contribution from lattice vibrations. We have calibrated our results against known exact solutions for limiting cases with very high accuracy. Having understood this problem, we are now extending our Langevin code to higher dimensions.

8705 (LBL–36050) **Nonlinear optics and organic materials.** Shen, Y.R. Lawrence Berkeley Lab., CA (United States). Jul 1994. 15p. Sponsored by USDOE, Washington, DC (United States);National Science Foundation, Washington, DC (United States). DOE Contract AC03-76SF00098. Grant DMR-9025106. (CONF-9405275–1: 4. IKETANI conference on optically nonlinear organic materials and applications, Kamuela, HI (United States), 16-18 May 1994). Order Number DE95004677. Source: OSTI; NTIS; GPO Dep.

We shall consider an interesting topic relating nonlinear optics and organic materials: how nonlinear optics can be used to study organic materials. One of the main differences between linear and nonlinear responses of a medium to incoming radiation is in their symmetries. It leads to the possibility that some properties of the medium could be more sensitively probed by nonlinear, rather than linear, optical means, or vise versa. A well-known example is that some vibrational modes of a medium could be Raman-active but infrared-inactive, and would be more readily observed by Raman scattering, which is a two-photon transition process. In this paper, we shall discuss, with the help of three examples, how we can use second harmonic generation (SHG) and sum frequency generation (SFG) to obtain unique information about a material. We shall focus on thin films, surfaces, and interfaces.

8706 (PPPL–3032) **Important plasma problems in astrophysics.** Kulsrud, R.M. Princeton Univ., NJ (United States). Plasma Physics Lab. Jan 1995. 43p. Sponsored by USDOE, Washington, DC (United States);National Science Foundation, Washington, DC (United States);National Aeronautics and Space Administration, Washington, DC (United States). DOE Contract AC02-76CH03073. NSF Grant AST-9121847; NASA Grant NAGW-4219. Order Number DE95006231. Source: OSTI; NTIS; INIS; GPO Dep.

In astrophysics, plasmas occur under very extreme conditions. For example there are ultra strong magnetic fields in neutron stars) relativistic plasmas around black holes and in jets, extremely energetic particles such as cosmic rays in the interstellar medium, extremely dense plasmas in accretion disks, and extremely large magnetic Reynold's numbers in the interstellar medium. These extreme limits for astrophysical plasmas make plasma phenomena much simpler to analyze in astrophysics than in the laboratory. An understanding of such phenomena often results in an interesting way, by simply taking the extreme limiting case of a known plasma

theory. I will describe one of the more exciting examples. I will attempt to convey the excitement I felt when I was first exposed to it. However, not all plasma astrophysical phenomena are so simple. There are certain important plasma phenomena in astrophysics, which have not been so easily resolved. In fact a resolution of them is blocking significant progress in astrophysical research. They have not yet yielded to attacks by theoretical astrophysicists nor to extensive numerical simulation. I will attempt to describe one of the more important of these plasma-astrophysical problems, and discuss why its resolution is so important to astrophysics. This significant example is fast, magnetic reconnection. Another significant example is the large-magnetic-Reynold's-number MHD dynamos.

8707 (UM-P–94/54) **Multi-particle correlations in quaternionic quantum systems.** Brumby, S.P. (Melbourne Univ., Parkville, VIC (Australia). School of Physics); Joshi, G.C.; Anderson, R. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 16p. (RCHEP–94/15.). Order Number DE95616271. Source: OSTI; NTIS (US Sales Only); INIS.

The authors investigated the outcomes of measurements on correlated, few-body quantum systems described by a quaternionic quantum mechanics that allows for regions of quaternionic curvature. It was found that a multi particles interferometry experiment using a correlated system of four nonrelativistic, spin-half particles has the potential to detect the presence of quaternionic curvature. Two-body systems, however, are shown to give predictions identical to those of standard quantum mechanics when relative angles are used in the construction of the operators corresponding to measurements of particle spin components. 15 refs.

8708 (UM-P–94/76) **Extensions and results from a method for evaluating fractional integrals.** Kowalenko, V. (Melbourne Univ., Parkville, VIC (Australia). School of Physics); Glasser, M.L. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 50p. Order Number DE95616272. Source: OSTI; NTIS (US Sales Only); INIS.

A method has been derived from Laplace transform that enables the evaluation of Weyl fractional integrals by transforming them into known integrals. This method is adapted and extended in a variety of ways to demonstrate the utility of the method in deriving alternative representations for other classes of integrals. The authors utilised the Feynman integral of quantum electrodynamics and found that they could develop more sophisticated results from this integral, which are given in Appendix C. A list of various fractional integrals evaluated by this technique is presented in Appendix A. 15 refs.

6621 General Theory of Particles and Fields

Refer also to citation(s) 8666, 8672, 8673, 8675, 8677, 8695, 8783, 8804, 8809, 8815, 8830, 8838

8709 (ANL-HEP-PR–94-79) **Scale-invariant Lipatov kernels from t-channel unitarity.** Coriano, C.; White, A.R. Argonne National Lab., IL (United States). 10 Nov 1994. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9409257–2: 24. international symposium on multiparticle dynamics, Vietri sul Mare (Italy), 12-19 Sep 1994). Order Number DE95004625. Source: OSTI; NTIS; INIS; GPO Dep.

The Lipatov equation can be regarded as a reggeon Bethe-Salpeter equation in which higher-order reggeon interactions give higher-order kernels. Infra-red singular contributions in a general kernel are produced by t-channel nonsense states and the allowed kinematic forms are determined by unitarity. Ward identity and infra-red finiteness gauge invariance constraints then determine the corresponding scale-invariant part of a general higher-order kernel.

8710 (BNL–61011) **Chiral symmetry on the lattice.** Creutz, M. Brookhaven National Lab., Upton, NY (United States). Nov 1994. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-9409269–1: Lattice '94, Bielefeld (Germany), 25 Sep - 1 oct 1994). Order Number DE95003962. Source: OSTI; NTIS; INIS; GPO Dep.

The author reviews some of the difficulties associated with chiral symmetry in the context of a lattice regulator. The author discusses the structure of Wilson Fermions when the hopping parameter is in the vicinity of its critical value. Here one flavor contrasts sharply with the case of more, where a residual chiral symmetry survives anomalies. The author briefly discusses the surface mode approach, the use of mirror Fermions to cancel anomalies, and finally speculates on the problems with lattice versions of the standard model.

8711 (BNL–61139) **Update on B_K with Wilson fermions.** Bernard, C. (Washington Univ., St. Louis, MO (United States). Dept. of Physics); Soni, A. Brookhaven National Lab., Upton, NY (United States); Washington Univ., St. Louis, MO (United States). Dept. of Physics. Dec 1994. 3p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016 ; FG02-91ER40628. (CONF-9409269–2: Lattice '94, Bielefeld (Germany), 25 Sep - 1 oct 1994). Order Number DE95004953. Source: OSTI; NTIS; INIS; GPO Dep.

The K-$\bar{K}$ mixing matrix element is a hadronic matrix element that is of crucial importance to electroweak phenomenology. For convenience, the authors introduce the so called bag parameter, B_K. It has been known for a long time that B_K is amenable to lattice Monte-Carlo methods. Indeed, recently Sharpe and collaborators, using staggered formulation for fermions have made remarkable progress in calculating B_K and have reported a result with an impressive accuracy. In this work the authors will present their results for B_K using the Wilson formulation for fermions.

8712 (BNL–61142) **24-th Order high temperature expansion for the 3-d Ising model.** Glaessner, U. (Univ. of Wuppertal Gausstrasse (Germany). Physics Dept.); Schilling, K.; Bhanot, G.; Creutz, M. Argonne National Lab., IL (United States). Dec 1994. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-9409269–3: Lattice '94, Bielefeld (Germany), 25 Sep - 1 oct 1994). Order Number DE95004952. Source: OSTI; NTIS; INIS; GPO Dep.

The authors present the series for the free energy and their estimate for the critical exponent α, as computed by a recursive bookkeeping algorithm on the CM5. They begin with a discussion of the algorithm to compute the High-Temperature expansion on finite 3-D Ising lattices.

8713 (BUDKERINP–93-93) **SO(8) colour as possible origin of generations.** Silagadze, Z.K. AN SSSR, Novosibirsk (Russian Federation). Inst. Yadernoj Fiziki. 1993. 42p. (IYaF–93-93.). Order Number DE95613560. Source: OSTI; NTIS (US Sales Only); INIS.

A possible connection between the existence of three quark-lepton generations and the triality property of SO(8) group (the equality between 8-dimensional vectors and spinors) is investigated. SO(8) appears to be a natural one-flavour unification group. Family formation due to weak interactions results in SO(10) group and a broken triality symmetry. Further speculations about how to restore this symmetry lead finally to E_6 exceptional group and three quark-lepton families. 22 refs.

8714 (DOE/ER/40291–22) **CP violation tests for tau/top processes.** Nelson, C.A. State Univ. of New York, Binghamton, NY (United States). Dept. of Physics. [1994]. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-86ER40291. (CONF-9403198–1: La Thuile conference on elementary particles, Aosta Valley (Italy), 7-12 Mar 1994). Order Number DE95005924. Source: OSTI; NTIS; INIS; GPO Dep.

This paper reviews the following topics: tests for CP violation in top-quark production and decay processes. In particular, $m_t = 174 \pm 17$ GeV implies good top-quark polarimetry because the W bosons in t-quark decays must be predominantly longitudinally polarized ($\Gamma_L/\Gamma_T = 2.4$). Tests for CP violation in tau lepton decays by the $\tau \rightarrow \rho\nu$ decay mode by usage of ρ polarimetry signatures. Tests for complete measurement of the $Z^0,\gamma^* \rightarrow \tau^-\tau^+$ vertex, including tests for CP violation in tau production processes.

8715 (DOE/ER/40291–23) **q-bosons and the q-analogue quantized field.** Nelson, C.A. State Univ. of New York, Binghamton, NY (United States). Dept. of Physics. [1994]. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-86ER40291. (CONF-9403139–2: Workshop on harmonic oscillators, Cocoyoc (Mexico), 23-25 Mar 1994). Order Number DE95005925. Source: OSTI; NTIS; INIS; GPO Dep.

The q-analogue coherent states $|z>_q$ are used to identify physical signatures for the presence of a q-analogue quantized radiation field in the $|\ >_q$ classical limit where $|z|$ is large. In this quantum-optics-like limit, the fractional uncertainties of most physical quantities (momentum, position, amplitude, phase) which characterize the quantum field are O(1). They only vanish as $O(1/|z|)$ when $q = 1$. However, for the number operator, N, and the N-Hamiltonian for a free q-boson gas, $H_N = \hbar\omega(N + 1/2)$, the fractional uncertainties do still approach zero. A signature for q-boson counting statistics is that $(\Delta N)^2/<N> \rightarrow 0$ as $|z| \rightarrow \infty$. Except for its O(1) fractional uncertainty, the q-generalization of the Hermitian phase operator of Pegg and Barnett, ϕ_q, still exhibits normal classical behavior. The standard number-phase uncertainty-relation, $\Delta N\ \Delta\phi_q = 1/2$, and the approximate commutation relation, $[N,\phi_q] = i$, still hold for the single-mode q-analogue quantized field. So, N and ϕ_q are almost canonically conjugate operators in the $|z>_q$ classical limit. The $|z>_q$ CS's minimize this uncertainty relation for moderate $|z|^2$.

8716 (DOE/ER/40291–24) **CP violation tests for top/tau processes.** Nelson, C.A. State Univ. of New York, Binghamton, NY (United States). Dept. of Physics. 30 Apr 1994. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-86ER40291. (CONF-940722–39: 27. international conference on high energy physics, Glasgow (United Kingdom), 21-27 Jul 1994). Order Number DE95005926. Source: OSTI; NTIS; INIS; GPO Dep.

This paper reviews the following topics: Tests for CP violation in top-quark production and decay processes. In particular, $m_t = 174 \pm 17$GeV implies good top-quark polarimetry because the W bosons in t-quark decays must be predominantly longitudinally polarized ($\Gamma_L/\Gamma_T = 2.4$). Tests for CP violation in tau lepton decays by the $\tau \rightarrow \rho\nu$ decay mode by usage of ρ polarimetry signatures. Tests for complete measurement of the $Z^0,\gamma^* \rightarrow \tau^-\tau^+$ vertex, including tests for CP violation in tau production processes.

8717 (DOE/ER/40291–25) **Tests for leptonic CP violation in tau decays.** Nelson, C.A.; Kim, M.; Yang, Hui-Chun. State Univ. of New York, Binghamton, NY (United States). Dept. of Physics. [1994]. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-86ER40291. (CONF-940722–40: 27. international conference on high energy physics, Glasgow (United Kingdom), 21-27 Jul 1994). Order Number DE95005927. Source: OSTI; NTIS; INIS; GPO Dep.

At the Z^0 or a B factory, there are two tests for non-CKM-type leptonic CP violation in the $\tau \rightarrow \rho\nu(a_1{}^-\nu)$ decay channel by inclusion of $\rho(a_1)$ polarimetry. By CP invariance, the moduli ratio of, and the phase difference between, the two helicity amplitudes for $\tau^- \rightarrow \rho^-\nu(a_1{}^-\nu)$ decay should equal those for $\tau^+ \rightarrow \rho^+\bar{\nu}(a_1{}^+\bar{\nu})$ decay. Formulas are given for a L-handed ν_τ, and also for an arbitrary mixture of ν_L and ν_R neutrino helicities. Statistical errors are listed for both the case that the τ^- momentum direction is not know, and when it is known via a silicon vertex detector.

8718 (IC–94/240) **Ricci-flat Kaehler metrics on symmetric varieties.** Azad, H.; Kobayashi, R. International Centre for Theoretical Physics, Trieste (Italy). Aug 1994. 53p. Order Number DE95613459. Source: OSTI; NTIS (US Sales Only); INIS.

We prove the existence of a complete Ricci-flat Kaehler metric on symmetric varieties and describe its asymptotic behaviour at infinity. (author). 32 refs, 2 figs, 2 tabs.

8719 (IC–94/289) **Some functional solutions of the Yang-Baxter equation.** Stoyanov, D.Ts. International Centre for Theoretical Physics, Trieste (Italy). Sep 1994. 8p. (INRNE-Th–02/94.). Order Number DE95613584. Source: OSTI; NTIS (US Sales Only); INIS.

A general functional definition of the infinite dimensional quantum R-matrix satisfying the Yang-Baxter equation is given. A procedure for extracting a finite dimensional R-matrix from the general definition is demonstrated in a particular case when the group SU(2) takes place. (author). 6 refs.

8720 (IC–94/290) **Introduction to the theory of Goyaks. Operator manifold approach to geometry and particle physics.** Kazarian, G.T. Ter. International Centre for Theoretical Physics, Trieste (Italy). Sep 1994. 76p. Order Number DE95613460. Source: OSTI; NTIS (US Sales Only); INIS.

The main purpose of the theory of goyaks is the generalization and the further expansion of the basic ideas of the theory of distortion of space-time continuum, in order to find out the basic deeper structures, that underlay both geometry G(223) and particles. It will be appropriate to turn to them as the primordial deeper structures. Suggested theory will address itself to the question of the origin of fundamental concepts of particle physics, such as the quarks, their spins, internal symmetries and associated with them different charges. Within its context the prime-cause of origin of mentioned above fundamental principles, especially of the most challenging ones, just such as Gauge and Color Confinement principles, will be cleared up. 47 refs.

8721 (IC–94/305) **Light-front dynamics of Chern-Simons systems.** Srivastava, P.P. International Centre for Theoretical Physics, Trieste (Italy). Oct 1994. 17p. Order Number DE95613467. Source: OSTI; NTIS (US Sales Only); INIS.

The Chern-Simons theory coupled to complex scalars is quantized on the light-front in the local light-cone gauge by constructing the self-consistent Hamiltonian theory. It is shown that no inconsistency arises on using two local gauge-fixing conditions in the Dirac procedure. The light-front Hamiltonian turns out to be simple and the framework may be useful to construct renormalized field theory of particles with fractional statistics (anyons). The theory is shown to be relativistic and the extra term in the transformation of the matter field under space rotations, interpreted in previous works as anomaly, is argued to be gauge artefact. (author). 20 refs.

8722 (IC–94/307) **Resonant re-formation of the vacuum.** Berezhiani, V.I. (International Centre for Theoretical Physics, Trieste (Italy)); Mahajan, S.M.; Dvali, G. International Centre for Theoretical Physics, Trieste (Italy). Sep 1994. 7p. Order Number DE95613468. Source: OSTI; NTIS (US Sales Only); INIS.

It is shown that in a system of two interacting scalar fields, low amplitude coherent oscillations of one about its minimum can resonantly excite the other such that the latter can make a transition from a given vacuum state to another local minimum state. This phenomenon can have important applications for the inflationary scenarios and can lead to a re-formation of the vacuum structures after inflation. (author). 2 refs, 1 fig.

8723 (IC–94/322) **Equivalence of two non-commutative geometry approaches.** Guo Hanying (CCAST (World Lab.), Beijing (China)); Wu Ke; Li Jianming. International Centre for Theoretical Physics, Trieste (Italy). Oct 1994. 12p. Order Number DE95613469. Source: OSTI; NTIS (US Sales Only); INIS.

We show that differential calculus on discrete group Z_2 is equivalent to A. Connes' approach in the case of two discrete points. They are the same theory in terms of different basis and the discrete group Z_2 is the permutation group of two discrete point. (author). 11 refs.

8724 (IC–94/336) **A BRST charge for non-critical $W_{2,s}$ strings.** Palacios, L. International Centre for Theoretical Physics, Trieste (Italy). Oct 1994. 11p. Order Number DE95613470. Source: OSTI; NTIS (US Sales Only); INIS.

We present a general argument for the construction of BRST charges of the 'non-critical' $W_{2,4}$, $W_{2,5}$ $W_{2,6}$, and $W_{2,8}$ strings. This evidences the existence of BRST charges for a kind of soft-type algebras which can be constructed from two copies of quantum $W_{2,s}$ algebras, (s=3,4,5,6,8). (author). 15 refs.

8725 (IC–94/338) **On perturbative asymptotic of Regge trajectories.** Sergeenko, M.N. International Centre for Theoretical Physics, Trieste (Italy). Oct 1994. 10p. Order Number DE95613585. Source: OSTI; NTIS (US Sales Only); INIS.

The perturbative asymptotic of the Regge trajectories, $\alpha(t)$, at $-t \rightarrow \infty$ is deduced on the basis of a known solution of relativistic wave equation with the Coulomb-like potential. We obtain the perturbative asymptotic at $-t \rightarrow \infty$ of the leading S=1 quarkonium Regge trajectories of the form $\alpha_R(t) = 0$, and leading S=1/2 nucleon Regge trajectories of the form $\alpha_N(t) = -1/2$. (author). 19 refs.

8726 (INIS-mf–14440, pp. 1) **On the inhomogeneous quantum groups.** Aghamohammadi, A. Iranian Physics Society, Teheran (Iran, Islamic Republic of); Sharif Univ. of Technology, Teheran (Iran, Islamic Republic of). Dept. of Physics. Aug 1994.

91p. (In English, Persian). (CONF-9408203–: Annual physics conference of Iran, Sanandaj (Iran, Islamic Republic of), 19 Aug - 1 sep 1994). In *Abstracts of annual physics conference of Iran, 1373 Kordestan University.* Order Number DE95611717. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. SYMMETRY GROUPS; DEFORMATION; GRADED LIE GROUPS; LORENTZ GROUPS; POINCARE GROUPS

8727 (INIS-mf–14440, pp. 1) **Quantum chains with G L q(2) symmetry.** Karimipour, V. Iranian Physics Society, Teheran (Iran, Islamic Republic of); Sharif Univ. of Technology, Teheran (Iran, Islamic Republic of). Dept. of Physics. Aug 1994. 91p. (In English, Persian). (CONF-9408203–: Annual physics conference of Iran, Sanandaj (Iran, Islamic Republic of), 19 Aug - 1 sep 1994). In *Abstracts of annual physics conference of Iran, 1373 Kordestan University.* Order Number DE95611717. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. SYMMETRY GROUPS; HAMILTONIANS; HEISENBERG MODEL; ISING MODEL

8728 (INIS-mf–14440, pp. 1-2) **Geometrical and non-geometrical constants of de sitter spacetime.** Rezania, V.; Dehghani, M.H. Iranian Physics Society, Teheran (Iran, Islamic Republic of); Shiraz Univ. (Iran, Islamic Republic of). Aug 1994. 91p. (In English, Persian). (CONF-9408203–: Annual physics conference of Iran, Sanandaj (Iran, Islamic Republic of), 19 Aug - 1 sep 1994). In *Abstracts of annual physics conference of Iran, 1373 Kordestan University.* Order Number DE95611717. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. DE SITTER GROUP/space-time; SPACE-TIME; PHASE SPACE; SO GROUPS

8729 (INIS-mf–14440, pp. 1) **Quantum tunnelling and Heisenberg equation of motion.** Sarbishe-ee, M.; Tavas-soli, M.K. Iranian Physics Society, Teheran (Iran, Islamic Republic of); Ferdowsi Univ., Mashhad (Iran, Islamic Republic of). Dept. of Physics. Aug 1994. 91p. (In English, Persian). (CONF-9408203–: Annual physics conference of Iran, Sanandaj (Iran, Islamic Republic of), 19 Aug - 1 sep 1994). In *Abstracts of annual physics conference of Iran, 1373 Kordestan University.* Order Number DE95611717. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. TUNNEL EFFECT/equations of motion; HAMILTONIANS; POSITION OPERATORS; POTENTIALS; SU-2 GROUPS

8730 (JINR-E–2-94-258) **Large Scale Periodicity of the Universe and Baryogenesis.** Chizhov, M.V. (Sofia Univ. (Bulgaria)); Kirilova, D.P. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1994. 7p. Order Number DE95613461. Source: OSTI; NTIS (US Sales Only); INIS.

A mechanism for generating baryon perturbations in the scalar field condensate baryogenesis scenario is proposed. This mechanism may naturally explain the observed periodic distribution of the luminous matter in the Universe with the characteristic scale of 128 h^{-1} M pc. It is found that both the observed baryon asymmetry and the periodicity in the large structure of the Universe can be explained through the behaviour of a complex scalar field condensate formed at the inflationary stage. (author). 10 refs.; 2 figs.

8731 (JINR-E–2-94-263) **A Queer Reduction of Degrees of Freedom.** Avdeev, L.V. (Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics); Chizhov, M.V. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1994. 6p. Order Number DE95613471. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Physics Letters. B.

The classical dynamics of antisymmetric second-rank tensor matter fields is analyzed. The conformally invariant action for the tensor field leads to a positive-definite Hamiltonian on the class of the solutions that are bounded at the time infinity (plane waves). Only the longitudinal waves contribute to the energy and momentum. The helicity proves to be equal to zero. 11 refs.

8732 (JINR-E–2-94-293) **Dynamical Analogy of Cabibbo-Kobayashi-Maskawa Matrices.** Beshtoev, Kh.M. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1994. 6p. Order Number DE95613462. Source: OSTI; NTIS (US Sales Only); INIS.

The dynamical analogy of Cabibbo-Kobayashi-Maskawa matrices is built. I.e. the expansion of the weak interaction theory with the inclusion of three doublets of the vector bosons $B^{\pm}$, $C^{\pm}$, $D^{\pm}$, leading to the quarks mixing is suggested. Estimation of the bosons masses is performed. The quasielastic processes proceeding through exchange of the bosons are given.

8733 (JINR-E–2-94-297) **The Interaction of Magnetizations with an External Electromagnetic Field and a Time-Dependent Magnetic Aharonov-Bohm Effect.** Afanas'ev, G.N. (Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics); Nelhiebel, M.; Stepanovskij, Yu.P. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1994. 20p. Order Number DE95613463. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Journal of Physics. A, Mathematical and General.

We investigate how the choice of the magnetization distribution inside the sample affects its interaction with the external electromagnetic field. The strong selectivity to the time dependence of the external electromagnetic field arises for the particular magnetizations. This can be used for the storage and ciphering of information. We propose a time-dependent Aharonov-Bohm-like experiment in which the phase of the wave function is changed by the time-dependent vector magnetic potential. The arising time-dependent interference picture may be viewed as a new channel for the information transfer. 15 refs., 4 figs.

8734 (LBL–36175) **Supersymmetry.** Murayama, Hitoshi. Lawrence Berkeley Lab., CA (United States). Jun 1994. 25p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00098. (CONF-9403122–4: INS symposium, Tokyo (Japan), 8-10 Mar 1994). Order Number DE95004670. Source: OSTI; NTIS; INIS; GPO Dep.

The author reviews phenomenologically interesting aspects of supersymmetry. First he points out that the discovery of the positron can be regarded as a historic analogue to the would-be discovery of supersymmetry. Second he reviews the recent topics on the unification of the gauge coupling constants, m_b-M_τ relation, proton decay, and baryogenesis. The author also briefly discusses the recent proposals to solve the problem of flavor changing neutral currents. Finally he argues that the measurements of supersymmetry parameters may probe the physics at the Planck scale.

8735 (SLAC-PUB–6640) **Quantum corrections for a cosmological string solution.** Behrndt, K. Stanford Linear Accelerator Center, Menlo Park, CA (United States). Aug 1994. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (HEP-TH–9408137; CONF-9405162–2: Symposium on particles, strings and cosmology, Syracuse, NY (United States), 19-24 May 1994). Order Number DE95006057. Source: OSTI; NTIS; INIS; GPO Dep.

The author investigates quantum corrections for a cosmological solution of the string effective action. Starting point is a classical solution containing an antisymmetric tensor field, a dilaton and a modulus field which has singularities in the scalar fields. As a first step he quantizes the scalar fields near the singularity with the result that the singularities disappear and that in general non-perturbative quantum corrections form a potential in the scalar fields.

8736 (SLAC-PUB–6662) **Testing supersymmetry at the next linear collider.** Feng, J.L. Stanford Univ., CA (United States). Sep 1994. 4p. Sponsored by USDOE, Washington, DC (United States);National Science Foundation, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-940816–70: Meeting of the Division of Particles and Fields of the American Physical Society, Albuquerque, NM (United States), 2-6 Aug 1994). Order Number DE95006064. Source: OSTI; NTIS; INIS; GPO Dep.

If new particles are discovered, it will be important to determine if they are the supersymmetric partners of standard model bosons and fermions. Supersymmetry predicts relations among the couplings and masses of these particles. The authors discuss the prospects for testing these relations at a future e^+e^- linear collider with measurements that exploit the availability of polarized beams.

8737 (SLAC-PUB–6673) **Creation of a scalar potential in 2D dilaton gravity.** Behrndt, K. Stanford Linear Accelerator Center, Menlo Park, CA (United States). Sep 1994. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-9407129–4: 7. Marcel Grossman meeting on general relativity, Stanford, CA (United States), 24-29 Jul 1994). Order Number DE95006066. Source: OSTI; NTIS; INIS; GPO Dep.

The authors investigate quantum corrections of the 2-d dilaton gravity near the singularity. Their motivation comes from a s-wave reduced cosmological solution which is classically singular in the scalar fields (dilaton and moduli). As a result they find, that the singularity disappears and a dilaton/moduli potential is created.

8738 (SLAC-PUB–6685) **Production of polarized τ pairs and tests of CP violation using polarized $e^{\pm}$ colliders near threshold.** Tsai, Yung Su. Stanford Linear Accelerator Center, Menlo Park, CA (United States). Oct 1994. 16p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-9408190–2: Tau-Charm factory in the era of B-factories and CESR conference; Workshop on hadron physics at $e^{+}e^{minus}$ colliders at IEHP, Stanford, CA (United States); Beijing (China), 15-16 Aug 1994; 14-18 oct 1994; CONF-941 Order Number DE95006151. Source: OSTI; NTIS; INIS; GPO Dep.

We consider the production of τ pairs by electron-positron colliding beams at the maximum cross section near the threshold. At this energy τ pairs are produced mostly in the s-wave which implies that the spin of the τ pairs are almost always pointing in the beam direction independent of the production angle. When both electrons and positrons are longitudinally polarized in the same direction, for example 90%, one can obtain τ pairs with 99% polarization in the direction of the polarization vectors of the incident beams. Tests of CP violation and study of the structure of weak interactions using such polarized τ pairs are discussed.

8739 (UM-P–93/75) **The solutions of affine and conformal affine Toda field theory.** Papadopoulos, G. (Hamburg Univ. (Germany). 1. Inst. fuer Theoretische Physik); Spence, B. Melbourne Univ., Parkville, VIC (Australia). School of Physics. Feb 1994. 10p. Sponsored by Australian Research Council, Canberra, ACT (Australia). Order Number DE95616280. Source: OSTI; NTIS (US Sales Only); INIS.

We give new formulations of the solutions of the field equations of the affine Toda and conformal affine Toda theories on a cylinder and two-dimensional Minkowski space-time. These solutions are parameterised in terms of initial data and the resulting covariant phase spaces are diffeomorphic to the Hamiltonian ones. We derive the fundamental Poisson brackets of the parameters of the solutions and give the general static solutions for the affine theory. (authors). 10 refs.

8740 (UM-P–93/77) **Integrals of motion in the two Killing vector reduction of general relativity.** Manojlovic, N. (Syracuse Univ., NY (United States). Dept. of Physics); Spence, B. Melbourne Univ., Parkville, VIC (Australia). School of Physics. Aug 1993. 19p. (SU-GP–93/7-8.). Order Number DE95616281. Source: OSTI; NTIS (US Sales Only); INIS.

We apply the inverse scattering method to the midi-superspace models that are characterized by a two-parameter Abelian group of motions with two spacelike Killing vectors. We present a formulation that simplifies the construction of the soliton solutions of Belinskii and Zakharov. Furthermore, it enables us to obtain the zero curvature formulation for these models. Using this, and imposing periodic boundary conditions corresponding to the Gowdy models when the spatial topology is a three torus T^3, we show that the equation of motion for the monodromy matrix is an evolution equation of the Heisenberg type. Consequently, the eigenvalues of the monodromy matrix are the generating functionals for the integrals of motion. Furthermore, we utilise a suitable formulation of the transition matrix to obtain explicit expressions for the integrals of motion. This involves recursion relations which arise in solving an equation of Riccati type. In the case when the two Killing vectors are hypersurface orthogonal the integrals of motion have a particularly simple form. (authors). 19 refs.

8741 (UM-P–93/87) **Plaquette expansion proof and interpretation.** Witte, N.S.; Hollenberg, L.C.L. Melbourne Univ., Parkville, VIC (Australia). School of Physics. 2 Sep 1993. 19p. Sponsored by Australian Research Council, Canberra, ACT (Australia). Order Number DE95616282. Source: OSTI; NTIS (US Sales Only); INIS.

The plaquette expansion, a general non-perturbative method for calculating the properties of lattice Hamiltonian systems, is established up to the first two orders for an arbitrary system. This method employs an expansion of the Lanczos coefficients, the tridiagonal Hamiltonian matrix elements or equivalently the continued fraction coefficients of the resolvent, in a descending series in the size of the system. The coefficients of this series are formed from the low order cumulants or connected Hamiltonian moments. The lowest order approximation in the plaquette expansion corresponds to a Gaussian model which is a consequence of the control limit theorem. 7 refs.

8742 (UM-P–93/90) **A general non-perturbative estimate of the energy density of lattice Hamiltonians.** Hollenberg, L.C.L.; Witte, N.S. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 14p. Sponsored by Australian Research Council, Canberra, ACT (Australia). Order Number DE95616283. Source: OSTI; NTIS (US Sales Only); INIS.

Employing a theorem on lower bounds on the zeros of orthogonal polynomials, the plaquette expansion to order $1/N_p$ of the tri-diagonal Lanczos matrix elements is solved for the ground state energy density in the infinite lattice limit. The resulting non-perturbative expression for the estimate of the energy density in terms of the connected coefficients to order $\langle H^4 \rangle_c$ is completely general. This expression is applied to various Hamiltonian systems - the Heisenberg model in D dimensions and SU(2) and SU(3) lattice gauge theory in 3 + 1 dimensions. In all cases the analytic estimate to the energy density is not only a significant improvement on the trial state, but is typically accurate to a few percent. The energy density of the D-dimensional Heisenberg model is predicted to approach ϵ_0(Neel) - 1/8 for large D. In the case of SU(2) and SU(3) the specific heat derived from the energy density peaks at the correct strong to weak coupling transition. 12 refs., 1 tab., 2 figs.

8743 (UM-P–93/91) **Two-loop vacuum amplitudes in a non-Abelian gauge theory on S_4.** Harris, B.A.; Joshi, G.C. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 35p. Order Number DE95616284. Source: OSTI; NTIS (US Sales Only); INIS.

The authors have developed a matrix element approach to quantum field theory on S_4, and used a complex l-plane method of performing the resulting angular momentum sums. The methods have been used to reproduce previous results for both one-loop and two-loop vacuum amplitudes for an Abelian gauge theory, including Dirac fermions and scalar bosons. In this paper they extend the formalism to non-Abelian gauge theory and show how the new complex l-plane methods allow the calculation of two-loop vacuum amplitudes involving ghost and gauge fields. It is shown how it is possible to overcome previous calculational limitations, resulting from the form of the ghost and gauge propagators, by performing the entire calculation in angular momentum space without reference to any particular configuration space form of the propagators. The two-loop interacting vacuum amplitude is derived in a non-Abelian gauge theory on a curved background and the required counterterm to renormalise the background gravitational action on S_4 is given. 12 refs., 4 figs.

8744 (UM-P–93/107) **Covariant phase space formulations of superparticles and supersymmetric WZW models.** Au, G.; Spence, B. Melbourne Univ., Parkville, VIC (Australia). School of Physics. Feb 1994. 15p. Sponsored by Australian Research Council, Canberra, ACT (Australia). Order Number DE95616278. Source: OSTI; NTIS (US Sales Only); INIS.

The Wess-Zumino-Witten (WZW) models are fundamental rational conformal field theories, and have a rich structure which has occasioned much interest. With regard to the further development of the formulation of this approach, as well as to the various applications of supersymmetric WZW models in superstring theories, the authors consider the question of whether one can generalise this covariant phase space formulation to the supersymmetric WZW models and discuss superparticles moving upon group manifolds. These systems share many of the important features of the

supersymmetric WZW models. The WZW models are then discussed. It is shown that the full current algebras arise naturally for these models and the topological issues which arose in the bosonic case are found here with the same resolution. 22 refs.

8745 (UM-P–93/112) **Complex conjugate pairs in stationary Sturmians.** Dortmans, P.J. (Universita di Padova, Padova (Italy). Inst. Nazionale di Fisica Nucleare e Dipart. di Fisica); Canton, L.; Pisent, G.; Amos, K. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 8p. Order Number DE95616279. Source: OSTI; NTIS (US Sales Only); INIS.

Sturmian expansions enable a simply accurate separable specification of two nucleon t matrices based upon realistic two nucleon interactions. Sturmian eigenstates specified by stationary scattering boundary conditions are particularly useful in that context, and they can be calculated by solving a generalised eigenvalue equation using real and symmetric matrices. In general, the spectrum of such an equation may contain complex eigenvalues. But to each complex eigenvalues there is a corresponding conjugate partner. In studies using realistic two nucleon potentials, and in certain positive energy intervals, these complex conjugated pairs indeed appear in the Sturmian spectrum. However, it is demonstrated that it is possible to recombine the complex conjugate pairs and corresponding states into a new, (and useful) pair of real eigenvalues and eigenstates with which of effect separable expansions of the (real) two nucleon reactance matrices. 8 refs.

8746 (UM-P–94/24) **Quantum dynamics in regions of quaternionic curvature.** Brumby, S.P.; Joshi, G. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 11p. (OZ–94/11.). Order Number DE95616276. Source: OSTI; NTIS (US Sales Only); INIS.

The complex unit appearing in the equations of quantum mechanics is generalised to a quaternionic structure on spacetime, leading to the consideration of complex quantum mechanical particles whose dynamical behaviour is governed by inhomogeneous Dirac and Schroedinger equations. Mixing of hyper-complex components of wavefunctions occurs through their interaction with potentials dissipative into the extra quaternionic degrees of freedom. An interferometric experiment is analysed to illustrate the effect. 11 refs.

8747 (UM-P–94/50) **CP violating effects in $e^+ e^- \rightarrow ZH$ and their optimization.** Ma, J.P.; McKellar, B.H.J. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 12p. Sponsored by Australian Research Council, Canberra, ACT (Australia). (RCHEP–94/13.). Order Number DE95616302. Source: OSTI; NTIS (US Sales Only); INIS.

The authors consider the possibilities of testing CP conservation in the process e+e- → ZH. The easiest is to measure the forward-backward asymmetry of the Z boson, a nonzero value of which signals CP violation. The effects of CP violation are predicted in the two Higgs doublet model. Although the number of events is not large, useful information about CP violating parameters can be extracted. 13 refs., 3 figs.

8748 (UM-P–94/58) **What's wrong with anomalous chiral gauge theory?.** Kieu, T.D. Melbourne Univ., Parkville, VIC (Australia). School of Physics. May 1994. 9p. Sponsored by Australian Research Council, Canberra, ACT (Australia). (RCHEP–94/16.). Order Number DE95616285. Source: OSTI; NTIS (US Sales Only); INIS.

It is argued on general ground and demonstrated in the particular example of the Chiral Schwinger Model that there is nothing wrong with apparently anomalous chiral gauge theory. If quantised correctly, there should be no gauge anomaly and chiral gauge theory should be renormalisable and unitary, even in higher dimensions and with non-Abelian gauge groups. Furthermore, it is claimed that mass terms for gauge bosons and chiral fermions can be generated without spoiling the gauge invariance. 19 refs.

8749 (UM-P–94/64) **Beyond the variational principle in quantum field theory.** Hollenberg, L.C.L. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 8p. Sponsored by Australian Research Council, Canberra, ACT (Australia). (RCHEP–94/18.). Order Number DE95616286. Source: OSTI; NTIS (US Sales Only); INIS.

A method of summing diagrams in quantum field theory beyond the variational Gaussian approximation is proposed using the continuum form of the recently developed plaquette expansion. In the context of $\lambda \phi^4$ theory the Hamiltonian, H [ϕ], of Schroedinger functional equation H [ϕ] Ψ [ϕ] = E Ψ [ϕ] can be written down in tri-diagonal form as a cluster expansion in terms of connected moment coefficients derived from Hamiltonian moments with respect to a trial state V_1 [ϕ]. The usual variational procedure corresponds to minimizing the zeroth order of this cluster expansion. At first order in the expansion the Hamiltonian in this form can be diagonalized analytically. the subsequent expression for the vacuum energy E contains Hamiltonian moments up to fourth order and hence is a summation over multi-loop diagrams laying the foundation for the calculation of the effective potential beyond the Gaussian approximation. 7 refs., 1 tab.

8750 (UM-P–94/74) **Electroweak interactions on the lattice.** Kieu, T.D. Melbourne Univ., Parkville, VIC (Australia). School of Physics. Jul 1994. 6p. (RCHEP–94/22.). Order Number DE95616287. Source: OSTI; NTIS (US Sales Only); INIS.

It is shown that the lattice fermion doubling phenomenon is connected to the chiral anomaly which is unique to the electroweak interactions. The chiral anomaly is the breaking of chiral gauge symmetry at the quantum level due to the quantum fluctuations. Such breaking, however, is undesirable and to be avoided. The preservation of gauge symmetry imposes stringent constraints on acceptable chiral gauge theory. It is argued that the constraints are unnecessary because the conventional quantization of chiral gauge theory has missed out some crucial contributions of the chiral interactions. The corrected quantization yields consistent theory in which there is no gauge anomaly and in which various mass terms can be introduced with neither the loss of gauge invariance nor the need for the Higgs mechanism. The new quantization also provide a solution to the difficulty of how to model the electroweak interactions on the lattice. 9 refs. 1 fig.

8751 (UM-P–94/78) **The Foldy-Wouthuysen transformation.** Costella, J.P.; McKellar, B.H.J. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 9p. Sponsored by Australian Research Council, Canberra, ACT (Australia);USDOE Office of Energy Research, Washington, DC (United States). Grant DOE/ER40561. (RCHEP–94/23.). Order Number DE95616277. Source: OSTI; NTIS (US Sales Only); INIS.

The Foldy-Wouthuysen transformation of Dirac Hamiltonian is generally taught as a mathematical trick that allows one to obtain a two-component theory in the low-energy limit. It is not often emphasised that the transformed representation is the only one in which one can take meaningful classical limit, in terms of particles and antiparticles. The history and physics of this transformation are briefly revised. 12 refs.

8752 (UM-P–94/96) **Chiral gauge theory in four dimensions.** Kieu, T.D. (Melbourne Univ., Parkville, VIC (Australia). School of Physics). Melbourne Univ., Parkville, VIC (Australia). School of Physics. Sep 1994. 9p. Sponsored by Australian Research Council, Canberra, ACT (Australia). (IASSNS-HEP–94/70; RCHEP–94/26.). Order Number DE95616288. Source: OSTI; NTIS (US Sales Only); INIS.

A formulation of Abelian and non-Abelian chiral gauge theories is presented together with arguments for the unitarity and renormalizability in four dimensions. 15 refs.

6622 Specific Theories and Interaction Models; Particle Systematics

Refer also to citation(s) 8741, 8791, 8792, 8798, 8808, 8817, 8835

8753 (BNL–61179) **Probing anomalous gauge boson couplings at LEP.** Dawson, S. (Brookhaven National Lab., Upton, NY (United States)); Valencia, G. Brookhaven National Lab., Upton, NY (United States). [1994]. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-9409287–1: Joint US/Polish workshop on physics from planck scale to electroweak scale; Meeting of the Division of Particles and

Fields of the American Physical Society, Warsaw (Poland); Albuquerque, NM (United States), 21-24 Sep 1994; 2-6 aug 1994; Order Number DE95005934. Source: OSTI; INIS; NTIS; GPO Dep.

We bound anomalous gauge boson couplings using LEP data for the $Z \rightarrow \int\int$ partial widths. We use an effective field theory formalism to compute the one-loop corrections resulting from non-standard model three and four gauge boson vertices. We find that measurements at LEP constrain the three gauge boson couplings at a level comparable to that obtainable at LEPII.

8754 (DOE/ER/40880–1) **Measurement of the magnetically-induced QED birefringence of the vacuum and an improved search for laboratory axions: Technical report. Project definition study of the use of assets and facilities of the Superconducting Super Collider Laboratory.** Lee, S.A. (Colorado State Univ., Fort Collins, CO (United States). Dept. of Physics); Fairbank, W.M. Jr.; Toki, W.H.; Hall, J.L.; Kraushaar, P.F. Jr.; Jaffery, T.S. Colorado State Univ., Fort Collins, CO (United States). Dept. of Physics. 31 Oct 1994. 107p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG05-94ER40880. Order Number DE95005110. Source: OSTI; NTIS; INIS; GPO Dep.

The Colorado State Collaboration has studied the feasibility of a high sensitivity QED birefringence/axion search measurement. The objective of this work is to measure, for the first time, the birefringence induced in the vacuum on a light beam travelling in a powerful magnetic field. The same experimental setup also allows a highly sensitive search for axion or axion-like particles. The experiment would combined custom-designed optical heterodyne interferometry with a string of six SSC prototype superconducting dipole magnets at the N-15 site of the SSC Laboratory. With these powerful laser tools, sensitivity advances of 10^7 to 10^9 over previous optical experiments will be possible. The proposed experiment will be able to measure the QED light-by-light scattering effect with a 0.5% accuracy. The increased sensitivity for the axion-two photon interaction will result in a bound on this process rivaling the results based on astrophysical arguments. In the technical report the authors address the scientific significance of these experiments and examine the limiting technical parameters which control their feasibility. The proposed optical/electronic scheme is presented in the context of a background of the known and projected systematic problems which will confront any serious attempt to make such measurements.

8755 (IC–94/261) **Spin puzzle in nucleon.** Ramachandran, R. International Centre for Theoretical Physics, Trieste (Italy). Sep 1994. 12p. Order Number DE95613654. Source: OSTI; NTIS (US Sales Only); INIS.

The object of this brief review is to reconcile different points of view on how the spin of proton is made up from its constituents. On the basis of naive quark model with flavour symmetry such as isospin or SU(3) one finds a static description. On the contrary the local SU(3) colour symmetry gives a dynamical view. Both these views are contrasted and the role of U(1) axial anomaly and the ambiguity for the measurable spin content is discussed. (author). 16 refs, 1 fig.

8756 (IC–94/277) **Renormalization group analyses of particle masses in full four-generation fermion condensate scheme.** Zhou Bangrong. International Centre for Theoretical Physics, Trieste (Italy). Sep 1994. 28p. Order Number DE95613595. Source: OSTI; NTIS (US Sales Only); INIS.

The renormalization group analyses of the masses of the heavy fermions and the Higgs boson, including the discussions of possible fixed points and applicability of perturbation theory, are expounded in the full four-generation quark-lepton condensate scheme of the minimal electroweak symmetry breaking. The results also indicate that the model could accommodate itself to the top-quark mass m_t = 160 - 180GeV. The predicted Higgs boson mass is in fact not too sensitive to the above change of m_t. It is also found that for a model without the fourth generation of leptons, the limitation to Λ imposed by the requirement that the masses of the fourth generation of extra quarks are bigger than m_t = 174GeV could be greatly relaxed up to $\leq 10^{11}$ GeV. (author). 16 refs, 4 tabs.

8757 (IC–94/285) **Electromagnetic-gravitational conversion cross sections in external electromagnetic fields.** Hoang Ngoc Long (National Center for Natural Science and Technology, Boho, Hanoi (Viet Nam). Inst. of Theoretical Physics); Dang Van Soa; Tuan Tran, A. International Centre for Theoretical Physics, Trieste (Italy). Sep 1994. 11p. Order Number DE95613589. Source: OSTI; NTIS (US Sales Only); INIS.

The classical processes: the conversion of photons into gravitons in the static electromagnetic fields are considered by using Feynman perturbation techniques. The differential cross sections are presented for the conversion in the electric field of the flat condenser and the magnetic field of the solenoid. A numerical evaluation shows that the cross sections may have the observable value in the present technical scenario. (author). 11 refs.

8758 (IC–94/302) **Once more on the radiative corrections to the nucleon structure functions in QCD.** Stamenov, D.B. International Centre for Theoretical Physics, Trieste (Italy). Sep 1994. 11p. Order Number DE95613655. Source: OSTI; NTIS (US Sales Only); INIS.

A new representation of the next to leading QCD corrections to the nucleon structure functions is given in terms of parton distributions. All $O(\alpha_s)$ corrections to the leading logarithmic approximation (LLA) are included. In contrast to the similar representations in the literature terms of order $O(\alpha^2_s)$ do not attend in our expressions for the nucleon structure functions taken in the next to leading logarithmic approximation. This result is generalized for any order in α_s beyond the LLA. Terms of order $O(\alpha^n_s)$ which belong only tot he approximation in consideration are present in such a representation for the structure functions. (author). 11 refs.

8759 (IC–94/306) **Structure formation with majoron supermultiplet.** Chun, E.J. International Centre for Theoretical Physics, Trieste (Italy). Oct 1994. 8p. Order Number DE95613596. Source: OSTI; NTIS (US Sales Only); INIS.

We show that the late-decaying particle scenario may be realized in the supersymmetric singlet majoron model with the majoron scale 10-200 TeV. The majoron decaying into two neutrinos is the late-decaying particle with the mass 0.1 - 1 TeV and the life-time 2 X 10^3 - 8 X 10^4 seconds. The lower limit of the majorino mass is 4 - 40 TeV in order to avoid the overclosure of the universe due to the decay-produced LSP. The muon neutrino and the tau neutrino can be used to explain the atmospheric and the solar neutrino deficit. (author). 18 refs, 2 tabs.

8760 (IC–94/323) **On approach to double asymptotic scaling at low x.** Choudhury, D.K. International Centre for Theoretical Physics, Trieste (Italy). Oct 1994. 8p. Order Number DE95613656. Source: OSTI; NTIS (US Sales Only); INIS.

We obtain the finite x correlations to the gluon structure function which exhibits double asymptotic scaling at low x. The technique used is the GLAP equation for gluon approximated at low x by a Taylor expansion. (author). 27 refs.

8761 (INIS-mf–14440, pp. 3) **Vacuum polarization by solitons in (1+1) dimensions.** Gousheh, S.S.; Mobilia, R.L. Iranian Physics Society, Teheran (Iran, Islamic Republic of); Texas Univ., Austin, TX (United States). Center for Particle Physics; Texas Univ., Austin, TX (United States). Center for Particle Theory. Aug 1994. 91p. (In English, Persian). (CONF-9408203–: Annual physics conference of Iran, Sanandaj (Iran, Islamic Republic of), 19 Aug - 1 sep 1994). In *Abstracts of annual physics conference of Iran, 1373 Kordestan University.* Order Number DE95611717. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. SOLITONS/vacuum polarization; EIGENFUNCTIONS; FERMIONS; HAMILTONIANS; SOLITONS

8762 (JINR-E–2-94-200) **On the Compton Twist-3 Asymmetries.** Korotkiyan, V.M.; Teryaev, O.V. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1994. 16p. Order Number DE95613627. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to the Proceedings of the Conference 'Spin-93', Protvino.

The 'fermionic poles' contribution to the twist-3 single asymmetry in the gluon Compton process is calculated. The 'gluonic poles' existence seems to contradict the density matrix positivity. Qualitative predictions for the direct photon and jets asymmetries are presented. 13 refs., 2 figs.

8763 (JINR-E–2-94-231) **Electromagnetic Hadron Mass Differences and Estimation of Isotopic Symmetry Violation Parameters of QCD Vacuum from Quark Model.** Dorokhov, A.E. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1994. 15p. Order Number DE95613628. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Nuclear Physics. A.

The estimations of the light quark mass differences, m_d - m_u, and the light quark condensate differences, $<D^-D>$ - $<U^-U>$, are obtained in the framework of the quark model with QCD vacuum induced quark interaction. We consider long-wave condensate and short wave instanton contributions to the electromagnetic hadron mass differences and show that the latter significantly improve the results on baryon octet. The results are :M_d - $m_u \approx 3.5$ MeV and $<D^-D>$ - $<U^-U> \approx -(0\approx) \cdot 10^{-3}$ $<U^-U>$. (author). 37 refs.; 1 tab.

8764 (JINR-E–2-94-248) **Form Factor of the Process $\gamma^*\gamma^*$ -> π^0 for Small Virtuality of One of the Photons and QCD Sum Rules (2): Sum Rule.** Radyushkin, A.V. (Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics); Ruskov, R. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1994. 20p. Order Number DE95613629. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Yadernaya Fizika.

We extend the QCD sum rule analysis of the $F_{\gamma^*\gamma^*}$ -> π^0 (q^2_1, q^2_2) form factor into the region where one of the photons has small virtuality: $-q^2_1- << -q^2_2- \geq 1$ GeV^2. In the kinematics one should perform an additional factorization of short- and long-distance contributions. The extra long distance sensitivity of the three-point amplitude is described by two-point correlators (bi locals), and the low-momentum dependence of the correlators involving composite operators of two lowest twists is extracted from auxiliary QCD sum rules. The sum rule obtained is regular in the limit q^2_1 -> 0. Our estimates for $F_{\gamma^*\gamma^*}$ -> π^0 ($q^2_1 = 0$, Q^2_2) are in good agreement with existing experimental data. (author). 22 refs.; 3 figs.

8765 (JINR-E–2-94-253) **New Tensor Interaction and the K_L -K_S Mass Difference.** Chizhov, M.V. (Sofia Univ. (Bulgaria)). Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1994. 8p. Order Number DE95613597. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Physics Letters. B.

The minimal standard electroweak model yields approximately half the observed value of the K_L - K_S mass difference. Antisymmetric tensor fields incorporated into the standard model can provide the rest 0.5 x $(\Delta m_{LS})_{exp}$. The effective lepton-lepton, quark-lepton and quark-quark tensor interactions induced by the charged tensor particles are presented. (author). 14 refs.; 3 figs.

8766 (JINR-E–2-94-303) **Instability of Weak Vacuum.** Kozlov, G.A. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1994. 11p. Order Number DE95613590. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Nuovo Cimento. A.

We study the characteristic features of a hypothetical candidate for new scalar field χ. The mass constraint under which such a χ-boson occurs is presented. The instability of weak vacuum is investigated. By considering the approximate breaking symmetry, we find that the mass $m_\chi < 15$ GeV of the χ-particle is unnatural. In the case of heavy enough top quark mass, $m_{top} \approx 170$ GeV (the recent CDF collaboration has reported $m_{top}^{exp} = 174 \pm 16$ GeV), we have carried out that the physically acceptable χ-boson upper bound will not exceed the 1 TeV level. For certain values of m_{top} and m_χ, the one-loop approximation consideration leads to the fact that the physical (our) vacuum cannot be absolutely stable. 14 refs.

8767 (JINR-E–2-94-372) **Color, Colored Quarks, Quantum Chromodynamics.** Tavkhelidze, A.N. (AN Gruzinskoj SSR, Tbilisi (Georgia)). Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1994. 14p. Order Number DE95613630. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to the International Seminar 'Quarks-94', Vladimir, RU, May, 1994.

In this report I dwell upon the ideas and methods that, in my opinion, have made for the creation and development of the modern theory of strong interactions. (author). 42 refs.; 2 tabs.

8768 (LA-UR–94-4365) **Chiral limit of QCD.** Gupta, R. Los Alamos National Lab., NM (United States). [1994]. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9409269–4: Lattice '94, Bielefeld (Germany), 25 Sep - 1 oct 1994). Order Number DE95005245. Source: OSTI; NTIS; INIS; GPO Dep.

This talk contains an analysis of quenched chiral perturbation theory and its consequences. The chiral behavior of a number of quantities such as the pion mass m_{pi}^2, the Bernard-Golterman ratios R and χ, the masses of nucleons, and the kaon B-parameter are examined to see if the singular terms induced by the additional Goldstone boson, η', are visible in present data. The overall conclusion (different from that presented at the lattice meeting) of this analysis is that even though there are some caveats attached to the indications of the extra terms induced by η' loops, the standard expressions break down when extrapolating the quenched data with $m_q < m_s/2$ to physical light quarks. I then show that due to the single and double poles in the quenched η', the axial charge of the proton cannot be calculated using the Adler-Bell-Jackiw anomaly condition. I conclude with a review of the status of the calculation of light quark masses from lattice QCD.

8769 (SLAC-PUB–6658) **Recent progress in one-loop multi-parton calculations.** Bern, Z. (Univ. of California, Los Angeles, CA (United States). Dept. of Physics); Dixon, L.; Dunbar, D.C.; Kosower, D.A. Stanford Linear Accelerator Center, Menlo Park, CA (United States); California Univ., Los Angeles, CA (United States). Dept. of Physics. Sep 1994. 5p. Sponsored by USDOE, Washington, DC (United States);Sloan (Alfred P.) Foundation, New York, NY (United States);National Science Foundation, Washington, DC (United States);North Atlantic Treaty Organization, Brussels (Belgium). DOE Contract AC03-76SF00515 ; FG03-91ER40662. Grant BR-3222; Grant PHY-9218990; Grant CRG-921322; Grant CRG-91 (CONF-9407135–2: QCD 94: nuclear physics B, Montpellier (France), 7-13 Jul 1994). Order Number DE95006062. Source: OSTI; NTIS; INIS; GPO Dep.

The authors describe techniques that simplify the calculation of one-loop QCD amplitudes with many external legs, which are needed for next-to-leading-order (NLO) corrections to multi-jet processes. The constraints imposed by perturbative unitarity, collinear singularities and a supersymmetry-inspired organization of helicity amplitudes are particularly useful. Certain sequences of one-loop helicity amplitudes may be obtained for an arbitrary number of external gluons using these techniques. They also report on progress in completing the set of one-loop helicity amplitudes required for NLO three-jet production at hadron colliders, namely the amplitudes with two external quarks and three gluons.

8770 (SLAC-PUB–6700) **Precision electroweak physics with the SLD/SLC: The left-right polarization asymmetry.** Rowson, P.C. (Columbia Univ., New York, NY (United States). Dept. of Physics). SLD Collaboration. Stanford Linear Accelerator Center, Menlo Park, CA (United States). Dec 1994. 11p. Sponsored by USDOE, Washington, DC (United States);National Science Foundation, Washington, DC (United States);Istituto Nazionale di Fisica Nucleare, Rome (Italy);Japan-US Cooperative Research Project on High Energy Physics, Nagoya (Japan);Science and Eng DOE Contract AC03-76SF00515 ; FG02-91ER40676 ; FG03-92ER40701 ; FG03-93ER40788 ; FG02-91ER40672 ; FG02-91ER40677 ; AC03-76SF000NSF Grant PHY-89-21320; NSF Grant PHY-92-04239; NSF Grant PHY-88 (CONF-9406273–4: Tennessee international symposium on radiative corrections, Gatlinburg, TN (United States), 27 Jun - 1 jul 1994). Order Number DE95006213. Source: OSTI; NTIS; INIS; GPO Dep.

Following a brief review of a commonly used general framework for the analysis of radiative corrections and possible new physics, the recent precision results from the SLD/SLC are discussed and

used to test the standard electroweak model. In the 1993 SLD/SLC run, the SLD recorded 50,000 Z events produced by the collision of longitudinally polarized electrons on unpolarized positrons at a center-of- nass energy of 91.26 GeV. The luminosity-weighted average polarization of the SLC electron beam was (63.0 ± 1.1)%. We measure the left-right cross-section asymmetry in Z boson production, A_{LR}, to be 0.1628 ± 0.0071 (stat) ± 0.0028 (syst) which determines the effective weak mixing angle to be $\sin^2 \theta_W^{eff}$ = 0.2292 ± 0.0009 (stat) ± 0.0004 (syst). When averaged with our 1992 result, we obtain $\sin^2 \theta_W^{eff}$ = 0.2294 ± 0. 0010. This result differs from analogous LEP results at the level of about 2.5 σ. The world averages of electroweak data are comfortably in agreement with the standard model.

8771 (UM-P–93/80) **Real Higgs singlet and electroweak phase transition in the standard model.** Choi, J.; Volkas, R.R. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 16p. (OZ–93/20.). Order Number DE95616315. Source: OSTI; NTIS (US Sales Only); INIS.

The effective potential at finite temperature is constructed within the minimal standard model when a real Higgs singlet is added on. It was found that a region of parameter space exists for which one can find a first order transition strong enough to prevent the erasure due to sphalerons of baryon asymmetry, while keeping the mass of the smallest Higgs boson above the experimental lower bound of about 60 GeV. 16 refs., 1 tab., 4 figs.

8772 (UM-P–93/81) **Effective Lagrangian approach to the fermion mass problem.** Shaw, D.S.; Volkas, R.R. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 22p. (OZ–93/21.). Order Number DE95616316. Source: OSTI; NTIS (US Sales Only); INIS.

An effective theory is proposed, combining the standard gauge group $SU(3)_C$ direct-product $SU(2)_L$ direct-product $U(1)_Y$ with a horizontal discrete symmetry. By assigning appropriate charges under this discrete symmetry to the various fermion fields and to (at least) two Higgs doublets, the broad spread of the fermion mass and mixing angle spectrum can be explained as a result of suppressed, non-renormalizable terms. A particular model is constructed which achieves the above while simultaneously suppressing neutral Higgs-induced flavour-changing processes. 9 refs., 3 tabs., 1 fig.

8773 (UM-P–93/106) **Approximate analytic diagonalization of lattice QCD.** Hollenberg, L.C.L. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 12p. Sponsored by Australian Research Council, Canberra, ACT (Australia). (OZ–93/25.). Order Number DE95616332. Source: OSTI; NTIS (US Sales Only); INIS.

The first order plaquette expansion of lattice Hamiltonians is applied to quantum chromodynamics with two massless quarks. Analytic expressions are obtained for the vacuum energy density, $\epsilon_0(g)$, and lowest vector and nucleon masses, $M_V(g)$ and $M_N(g)$. The vacuum energy density is valid into the weak coupling region down to about $g^2 \approx 0.8$, demonstrating the genuine non-perturbative nature of these approximates. The 'specific heat' derived from $\epsilon_0(g)$ agrees well with numerical calculations in the t-expansion. The ratio $R = M_N/M_V$ increases from the strong coupling limit of zero to a more realistic value of $R \approx 1.2 \rightarrow 1.3$ at the transition from strong to weak coupling. 12 refs., 3 figs.

8774 (UM-P–93/108) **Simulation with complex measures.** Kieu, T.D.; Griffin, C.J. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 3p. Order Number DE95616333. Source: OSTI; NTIS (US Sales Only); INIS.

The simulation of statistical and quantum systems suffers from the sign problem when the generating function measures are indefinite or are complex, such as lattice quantum chromodynamics with finite temperature and density and chiral gauge theory. A new approach is proposed which yields statistical errors smaller than the crude Monte Carlo using absolute values of the original measures. The one-dimensional complex-coupling Ising model is employed as an illustration. 2 refs., 1 tab., 1 fig.

8775 (UM-P–94/21) **Phenomenology of the two Higgs doublet sector of a quark-lepton symmetric model.** Lassig, C.C.; Volkas, R.R. Melbourne Univ., Parkville, VIC (Australia). School of Physics. Mar 1994. 19p. (OZ–94/8.). Order Number DE95616337. Source: OSTI; NTIS (US Sales Only); INIS.

In the simplest examples of models with a discrete quark-lepton symmetry, an electroweak symmetry braking sector with more than one Higgs doublet is necessary to obtain the correct mass relations between quarks and leptons. A two Higgs doublet model version has flavour-nonconserving Yukawa couplings, which are proportional to the masses of the quark-lepton symmetric partners of the fermions. The main focus of this paper will be on flavour-changing leptonic decays, in particular those of muons since these give the most opportunity for experimental investigation. The neutral Higgs mediated decay $\mu^- \rightarrow e^- e^+ e^-$ will be investigated at tree-level, as will the charged-Higgs contribution to the decay $\mu^- \rightarrow \nu_\mu e^- \bar{\nu}_e$. A one-loop calculation of the process $\mu \rightarrow e \gamma$ will be performed. This will lead on to an examination of the effect on the muon anomalous magnetic moment. Finally, the effect of the quark-lepton symmetric 2HDM contribution to $b \rightarrow s \gamma$ will briefly be considered. 10 refs., 2 figs.

6623 Specific Interactions, Decays and Processes

Refer also to citation(s) 7685, 8284, 8714, 8716, 8717, 8736, 8738, 8750, 8764, 8775, 8827, 8828, 8832, 8839, 8916

8776 (ANL-HEP-CP–94-68) **Proton-proton interactions using the RHIC polarized collider.** Yokosawa, A. Argonne National Lab., IL (United States). [1994]. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-940963–1: International seminar on high-energy physics problems: relativistic nuclear physics and QCD, Dubna (Russian Federation), 13-17 Sep 1994). Order Number DE95005839. Source: OSTI; NTIS; INIS; GPO Dep.

The first polarized collider where we collide 250-GeV/c beams of 70% polarized protons at high luminosity is under construction. This will allow a determination of the nucleon spin-dependent structure functions over a large range in x and a collection of sufficient W and Z events to investigate extremely interesting spin-related phenomena.

8777 (ANL-HEP-CP–94-76) **New results in nucleon-nucleon scattering at intermediate energies.** Spinka, H. Argonne National Lab., IL (United States). [1995]. 16p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9409103–12: International symposia on high energy spin physics and polarization phenomena in nuclear physics, Bloomington, IN (United States), 15-22 Sep 1994). Order Number DE95004594. Source: OSTI; NTIS; INIS; GPO Dep.

Many np elastic scattering spin observables have recently been measured between kinetic energies of about 500 and 1100 MeV at Saclay and LAMPF. These data are summarized and some new results are presented. Evidence for structure in pp observables near 2100 MeV is reviewed, and new data in this energy region are shown from SATURNE.

8778 (ANL/PHY/CP–84618) **Electromagnetic production of pions on the nucleon.** Lee, T.S.H. Argonne National Lab., IL (United States). [1994]. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-940858–1: International conference on physics with GeV particle beams, Juelich (Germany), 22-25 Aug 1994). Order Number DE95004658. Source: OSTI; NTIS; INIS; GPO Dep.

The objective of this talk is to review the recent theoretical developments in the study of photo- and electro-production of pions on the nucleon. First, the author will discuss the results from the investigations in the near threshold region. The focus here is the test of pion dynamics as predicted by the theoretical models with chiral symmetry. The second subject of this talk is concerned with the deformation of the Delta (Δ) state. The central question here is how this interesting quantity is defined theoretically and related to the experiments being performed at MIT-Bates and Mainz. The author then will discuss briefly the higher energy region where the productions of higher mass nucleon resonances (N^*) and two-pion states become important. The interest here is the test of $\gamma N \rightarrow N^*$ matrix elements as predicted by various QCD-based models of hadrons.

8779 (DOE/ER/03064–T2) **Budget projections 1988, 1989, and 1990 for research in high energy nuclear physics.** Harvard Univ., Cambridge, MA (United States). Dept. of Physics. Apr 1988. 77p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76ER03064. Order Number DE95004694. Source: OSTI; NTIS; GPO Dep.

Research programs in experimental high energy physics are carried out at Harvard under the general supervision of a departmental faculty committee on high energy physics. Professor R.F. Schwitters is currently chairman of this committee. The committee members are: G.W. Brandenburg, S. Geer, R.J. Glauber, K. Kinoshita, R. Nickerson, F.M. Pipkin, J. Rohlf, C. Rubbia, R.F. Schwitters, M. Shapiro, K. Strauch, R. Vanelli, and R. Wilson. Of these individuals, Professors R.J. Glauber, F.M. Pipkin, C. Rubbia, R.F. Schwitters, K. Strauch, and R. Wilson are the principal investigators with whom a number of junior faculty members and post-doctoral research fellows are associated. Dr. Brandenburg (Associate Director, High Energy Physics Laboratory) administers the High Energy Physics Laboratory and is in charge of the Computer Facility. Professor Rubbia is currently on leave of absence and will leave Harvard on December 31, 1988 to become the Director General of CERN. A reduced UA1 effort will remain at Harvard after Professor Rubbia's departure. Harvard is planning to make one or two senior faculty appointments in experimental high energy physics sometime in 1988-89. The principal goals of the work described here are to carry out forefront programs in high energy physics research and to provide first rate educational opportunities for students. The experimental program supported through HEPL is carried out at the major accelerator centers in the world and addresses some of the most important questions in high energy physics. Harvard's educational efforts are concentrated in graduate education, where they are currently supporting 15 research students. In addition, undergraduate students work in projects at HEPL during the academic year and over summers. Many of these students have gone on to graduate school studying physics at Harvard and elsewhere.

8780 (DOE/ER/03064–T3) **Budget projections 1989, 1990, and 1991 for research in high energy nuclear physics.** Harvard Univ., Cambridge, MA (United States). Dept. of Physics. May 1989. 58p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76ER03064. Order Number DE95004695. Source: OSTI; NTIS; GPO Dep.

Research programs in experimental high energy physics are carried out at Harvard under the general supervision of a departmental faculty committee on high energy physics. The committee members are: G.W. Brandenburg, S. Geer, R.J. Glauber, K. Kinoshita, R. Nickerson, F.M. Pipkin, R.F. Schwitters, M. Shapiro, K. Strauch, R. Vanelli, and R. Wilson. Of these individuals, Professors R.J. Glauber, F.M. Pipkin, R.F. Schwitters, K. Strauch, and R. Wilson are the principal investigators with whom a number of junior faculty members and post-doctoral research fellows are associated. Dr. Brandenburg is the Director of the High Energy Physics Laboratory and administers the DOE high energy physics contract. Professor Schwitters is currently on leave of absence as Director of the Superconducting Super Collider project. In the fall of 1990 Professor G. Feldman, who is currently at SLAC, will join the Harvard faculty and become a principal investigator. Harvard is planning to make one or two additional senior faculty appointments in experimental high energy physics over the next two years. The principal goals of the work described here are to carry out forefront programs in high energy physics research and to provide first rate educational opportunities for students. The experimental program supported through HEPL is carried out at the major accelerator centers in the world. Harvard's educational efforts are concentrated in graduate education, where they are currently supporting 15 research students. These budget projections cover all of the Harvard based high energy physics experimental activities. The "umbrella" nature of this contract greatly simplifies support of essential central technical and computer services and helps the group to take advantage of new physics opportunities and to respond to unexpected needs. The funding for the operation of the HEPL facility is shared equally by the experimental groups.

8781 (DOE/ER/03064–T4) **Budget projections 1990, 1991, and 1992 for research in high energy nuclear physics.** Harvard Univ., Cambridge, MA (United States). Dept. of Physics. May 1990. 67p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76ER03064. Order Number DE95004696. Source: OSTI; NTIS; INIS; GPO Dep.

Research programs in experimental high energy physics are carried out at Harvard under the general supervision of a departmental faculty committee on high energy physics. The committee members are: G.W. Brandenburg, M. Franklin, S. Geer, R. J. Glauber, K. Kinoshita, F. M. Pipkin, R. F. Schwitters, K. Strauch, M. E. Law, and R. Wilson. Of these individuals, Professors R.J. Glauber, F.M. Pipkin, R.F.Schwitters, K. Strauch, and R. Wilson are the principal investigators with whom a number of junior faculty members and post-doctoral research fellows are associated. Dr. Brandenburg is the Director of the High Energy Physics Laboratory and administers the DOE high energy physics contract. Professor Schwitters is currently on leave of absence as Director of the Superconducting Super Collider project. In the fall of 1990 Professor G. Feldman, who is currently at SLAC, will join the Harvard faculty and become a principal investigator. Harvard is planning to make one or two additional senior faculty appointments in experimental high energy physics over the next two years. The principal goals of the work described here are to carry out forefront programs in high energy physics research and to provide first rate educational opportunities for students. The experimental program supported through HEPL is carried out at the major accelerator centers in the world and addresses some of the most important questions in high energy physics. Harvard's educational efforts are concentrated in graduate education. These budget projections cover all of the Harvard based high energy physics experimental activities. The "umbrella" nature of this contract greatly simplifies support of essential central technical and computer services and helps the group to take advantage of new physics opportunities and to respond to unexpected needs. The funding for the operation of the HEPL facility is shared equally by the experimental groups.

8782 (DOE/ER/03064–T5) **Budget projections - 1991 through 1996 for research in high energy physics.** Harvard Univ., Cambridge, MA (United States). Dept. of Physics. May 1991. 72p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76ER03064. Order Number DE95004697. Source: OSTI; NTIS; INIS; GPO Dep.

This research program in high energy physics is carried out under the general supervision of a committee which is composed of G.W. Brandenburg, G.J. Feldman, M.E. Franklin, R.J. Glauber, K. Kinoshita, F.M. Pipkin, K. Strauch, R. Wilson, and H. Yamamoto. Professor G.J. Feldman currently serves as chair of this committee. Dr. Brandenburg is the Director of the High Energy Physics Laboratory and administers the DOE high energy physics contract. In the fall of 1991 S. Mishra will join this committee. Harvard is planning to make one or two additional senior faculty appointments in experimental high energy physics over the next two years. The principal goals of the work described here are to carry out forefront programs in high energy physics research and to provide first rate educational opportunities for students. The experimental program supported through HEPL is carried out at the major accelerator centers in the world and addresses some of the most important questions in high energy physics. Harvard's educational efforts are concentrated in graduate education, where they are currently supporting thirteen research students. In addition, undergraduate students work in projects at HEPL during the academic year and over summers. These budget projections cover all of the Harvard based high energy physics experimental activities. The "umbrella" nature of this contract greatly simplifies support of essential central technical and computer services and helps the group to take advantage of new physics opportunities and to respond to unexpected needs. The funding for the operation of the HEPL facility is shared proportionally by the experimental groups. Harvard financially supports this high energy physics research program in many ways.

8783 (DOE/ER/40291–26) **Tau as a probe for new physics.** Nelson, C.A. State Univ. of New York, Binghamton, NY (United States). Dept. of Physics. [1994]. 15p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-86ER40291.

(CONF-9409277–3: 3. workshop on tau lepton physics, Montreux (Switzerland), 19-22 Sep 1994). Order Number DE95005928. Source: OSTI; NTIS; INIS; GPO Dep.

The usage of polarimetry and spin-correlation tests to determine the complete Lorenz structure of the tau lepton's charged and neutral- current couplings is reviewed. The emphasis is on tests for "something" in a (V-A)+ "something" structure in $J^{charged}$ Lepton current, so as to bound the scales λ for "new physics" such as arising from tau weak magnetism, weak electricity, and/or second-class currents. Tests for T and for CP violation are discussed.

8784 (DOE/ER/40736–T1) **Elementary particle physics. Progress report, July 1992–October 1994.** Izen, J.M. Texas Univ., Dallas, TX (United States). Oct 1994. 60p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG05-92ER40736. Order Number DE95004376. Source: OSTI; NTIS; INIS; GPO Dep.

The University of Texas at Dallas (UTD) is participating in two e^+e^-, experiments, Beijing Spectrometer (BES) and BABAR, the PEP-11 B Factory detector. The UTD group consists of Profs. Joseph M. Izen and Xinchou Lou, seven Ph.D. students. A post-doc is requested to join them in this work. BES explores the physics of the τ-charm threshold region. Associated production of τ and charmed mesons allow for absolute branching fraction measurements with good control of backgrounds. BES is uniquely positioned to study the leptonic and hadronic decays of quarkonia. The Beijing Electron Positron Collider (BEPC) delivers luminosities an order of magnitude higher than earlier facilities. BES and BEPC will be upgraded following the 1994-5 run, and will resume data taking in Fall, 1996 with an improved detector and a Three-fold increase in luminosity. The raison d'etre of BABAR is the exploration of CP violation in the B meson system. An asymmetric storage ring is required to observe the time-dependence of the CP asymmetry. Other BABAR physics includes measurements of CKM matrix elements, rare B decays, penguin diagrams, B_s decays, and precision measurements of τ and D meson decays. The scheduled BABAR turn-on in 1999 provides the UTD group with a natural evolution with continuous physics during this period. Professors Joseph M. Izen and Xinchou Lou are leading the BES and BABAR program at UTD. Both have specialized in e^+e^- collider experiments and share 22 years of experience at the SPEAR, BEPC, CESR, PETRA, SLC and LEP rings.

8785 (FNAL/C–94/144-E) **Measurement of the SS-OS Dijet cross-section ratio.** Fermi National Accelerator Lab., Batavia, IL (United States). Jun 1994. 14p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH03000. (CONF-9407142–7: ICHEP '94, Glasgow (United Kingdom), 20-27 Jul 1994). Order Number DE95004852. Source: OSTI; NTIS; INIS; GPO Dep.

The authors present a measurement of the same-side to opposite side dijet cross section ratio in $p\bar{p}$ collisions at $\sqrt{s}$ = 1.8 TeV, using approximately 19 pb^{-1} of data collected by the Collider Detector at Fermilab during the 1992-93 run of the Fermilab Tevatron. They show that; for large pseudorapidities and small transverse energies, this ratio is sensitive to the gluon distribution at small x. They compare the measured values of the ratio with the theoretical predictions, smeared to incorporate detector effects, for a variety of parton distributions. Overall, They find very good agreement between the data and the predictions for a wide range of jet energies and pseudorapidities. At low transverse energies, there are some minor discrepancies between the data and the predictions that could arise from the effects of a more singular gluon distribution.

8786 (FNAL/C–94/209-E) **Photon-charm production in $p\bar{p}$ collisions at $\sqrt{s}$ = 1.8 TeV.** Hamilton, R.T. (Harvard Univ., Cambridge, MA (United States)). CDF Collaboration. Fermi National Accelerator Lab., Batavia, IL (United States). Aug 1994. 3p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH03000. (CONF-940816–82: Meeting of the Division of Particles and Fields of the American Physical Society, Albuquerque, NM (United States), 2-6 Aug 1994). Order Number DE95004850. Source: OSTI; NTIS; INIS; GPO Dep.

The authors present preliminary results of a measurement of inclusive photon-charm production in $p\bar{p}$ collisions. Using data collected by the CDF experiment during the 1992–1993 Tevatron collider run, the authors have measured the inclusive photon-muon cross section, and estimated the decay-in-flight and punchthrough backgrounds. They compare the measured photon-muon cross section and photon E_T spectrum to Pythia predictions for the charm Compton contribution.

8787 (FNAL/C–94/252-E) **B physics with CDF: Recent results and future prospects.** Mueller, J.A. (Rutgers Univ., Piscataway, NJ (United States). Dept. of Physics and Astronomy). CDF Collaboration. Fermi National Accelerator Lab., Batavia, IL (United States). Aug 1994. 28p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH03000. (CONF-9404228–1: 2. international workshop on B-physics at hadron machines (Beauty '94), Le Mont St. Michel (France), 24-29 Apr 1994). Order Number DE95004793. Source: OSTI; NTIS; INIS; GPO Dep.

Using data collected during the 1992–1993 collider run, we report on measurements of the B^0, B^+, and B_s lifetimes. We also present our revised measurement of the B_s mass. Production studies involving inclusive modes decaying into J/ψ or $\psi(2S)$, semileptonic decays involving D^0 or D^{*+} mesons, and fully reconstructed B mesons are also presented. We present the prospects for future work with this data, as well as that being collected in the 1994–1995 collider run. Upgrades to the detector and estimates of physics capabilities for future collider runs are also presented.

8788 (FNAL/C–94/293-E) **Search for supersymmetric $\tilde{W}_1$ and $\tilde{Z}_2$ states using the D0 detector.** Blessing, S.K. (Florida State Univ., Tallahassee, FL (United States)). D0 Collaboration. Fermi National Accelerator Lab., Batavia, IL (United States). Sep 1994. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH03000. (CONF-940816–68: Meeting of the Division of Particles and Fields of the American Physical Society, Albuquerque, NM (United States), 2-6 Aug 1994). Order Number DE95004581. Source: OSTI; NTIS; INIS; GPO Dep.

The search for signals from Supersymmetry at hadron colliders has largely been centered on the search for squark and gluino production, usually through events with large missing transverse energy (E_t). A promising alternative at the Tevatron is the search for production of the lightest chargino ($\tilde{W}_1$) and next-to-lightest neutralino ($\tilde{Z}_2$), with the assumptions that R-parity is conserved and the lightest neutralino ($\tilde{Z}_1$) is the lightest supersymmetric particle (LSP). Although the mass limit established by LEP experiments, $^2M_{\tilde{W}1}$ >45 GeV/c^2, excludes the on-shell process $p\bar{p} \rightarrow W^{\pm} \rightarrow \tilde{W}_1 + \tilde{Z}_2$, the off-shell process $W^{\pm} \rightarrow \tilde{W}_1\tilde{Z}_2$ can have a sizeable rate due to large $WW\tilde{W}_1\tilde{Z}_2$ coupling. Here, the status of a search for the pair production of the lightest chargino and second lightest neutralino states of the minimal supersymmetric model is presented. The authors searched for four tri-lepton final states: eee, eeμ, e$\mu\mu$, and $\mu\mu\mu$, all with missing transverse energy.

8789 (FNAL/C–94/404-E) **Study of the structure of the events produced in soft $p\bar{p}$ interactions at $\sqrt{s}$ = 1800 GeV.** Rimondi, F. Fermi National Accelerator Lab., Batavia, IL (United States). Dec 1994. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH03000. (CONF-9409257–3: 24. international symposium on multiparticle dynamics, Vietri sul Mare (Italy), 12-19 Sep 1994). Order Number DE95004851. Source: OSTI; NTIS; INIS; GPO Dep.

In this note preliminary results on a systematic study of the event structure dependence on the event multiplicity and/or event average p_t are presented. The mean p_t, the short range pseudorapidity correlations and the mean sphericity are analysed as a function of the event multiplicity. The mean sphericity and the mean multiplicity are studied as a function of the event average p_t.

8790 (IC–94/225) **On hadronic production of the B_c meson.** Chang Chaohsi (International Centre for Theoretical Physics, Trieste (Italy)); Chen Yuqi; Han Guoping; Jiang Hongtao. International Centre for Theoretical Physics, Trieste (Italy). Aug 1994. 18p. (AS-ITP–94-24.). Order Number DE95613726. Source: OSTI; NTIS (US Sales Only); INIS.

Various approaches to the hadronic productions of the double heavy meson B_c are investigated in this paper. The resultant cross sections obtained by the approaches are compared with in several

aspects. One may see that the differences are quite substantial. The advantages and shortcomings of the approaches are discussed. (author). 17 refs, 4 figs.

8791 (IC–94/327) **Search for new physics indirect effects in $e^+e^- \rightarrow W^+W^-$ at linear colliders with polarized beams.** Babich, A.A. (International Centre for Theoretical Physics, Trieste (Italy)); Pankov, A.A.; Paver, N. International Centre for Theoretical Physics, Trieste (Italy). Oct 1994. 19p. Contract ERBCHRXCT930132. (UTS-DFT–94-15.). Order Number DE95613688. Source: OSTI; NTIS (US Sales Only); INIS.

We discuss the potential of a 0.5TeV linear collider to explore manifestations of extended (or alternative) electroweak models of current interest, through measurements of the reaction $e^+e^- \rightarrow W^+W^-$ with both initial and final states polarization. Specifically, we consider the possibility to put stringent constraints on lepton mixing (or extended lepton couplings) and Z - Z' mixing, showing in particular the usefulness of polarization in order to disentangle these effects. (author). 22 refs, 7 figs, 2 tabs.

8792 (IC–94/333) **Unitarization of Koerner-Kuroda model of electromagnetic structure of octet $1/2^+$ baryons.** Dubnicka, S. (International Centre for Theoretical Physics, Trieste (Italy)); Dubnickova, A.Z.; Kraskiewicz, J.; Raczka, R. International Centre for Theoretical Physics, Trieste (Italy). Oct 1994. 23p. Order Number DE95613765. Source: OSTI; NTIS (US Sales Only); INIS.

The Koerner-Kuroda model of the electromagnetic structure of octet $1/2^+$ baryons is restored on a more topical physical basis. Electromagnetic radii of baryons under consideration are calculated and compared with other model predictions. By an incorporation of a two-cut approximation of correct form factor analytic properties and nonzero vector-meson widths, the Koerner-Kuroda model is unitarized, providing in this manner imaginary parts of the octet $1/2^+$ baryon form factors to be nonzero just starting from a branch point corresponding to the lowest threshold. (author). 32 refs, 16 figs, 2 tabs.

8793 (INIS-mf–14440, pp. 2) **Quarks search in cosmic rays.** Fatemi, S.J.; Ashton, F. Iranian Physics Society, Teheran (Iran, Islamic Republic of); Shahid Bahonar Univ., Kerman (Iran, Islamic Republic of). Dept. of Physics; Durham Univ. (United Kingdom). Aug 1994. 91p. (In English, Persian). (CONF-9408203–: Annual physics conference of Iran, Sanandaj (Iran, Islamic Republic of), 19 Aug - 1 sep 1994). In *Abstracts of annual physics conference of Iran, 1373 Kordestan University.* Order Number DE95611717. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. QUARKS/extensive air showers; PARTICLE TRACKS; QUARKS

8794 (INIS-mf–14440, pp. 2) **Comparison of gluon jets and quarks jets.** Zomorrodian, M.E. Iranian Physics Society, Teheran (Iran, Islamic Republic of); Ferdowsi Univ., Mashhad (Iran, Islamic Republic of). Aug 1994. 91p. (In English, Persian). (CONF-9408203–: Annual physics conference of Iran, Sanandaj (Iran, Islamic Republic of), 19 Aug - 1 sep 1994). In *Abstracts of annual physics conference of Iran, 1373 Kordestan University.* Order Number DE95611717. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. GLUONS; QUARKS; ANNIHILATION; ELECTRON-POSITRON INTERACTIONS; GLUONS; PARTICLE RAPIDITY; QUARKS

8795 (INIS-mf–14440, pp. 3) **B to D and D to K semileptonic weak decay form factors.** Haghighat, H. Iranian Physics Society, Teheran (Iran, Islamic Republic of); Shiraz Univ. (Iran, Islamic Republic of). Dept. of Physics. Aug 1994. 91p. (In English, Persian). (CONF-9408203–: Annual physics conference of Iran, Sanandaj (Iran, Islamic Republic of), 19 Aug - 1 sep 1994). In *Abstracts of annual physics conference of Iran, 1373 Kordestan University.* Order Number DE95611717. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. SEMILEPTONIC DECAY/form factors; B MESONS; BETHE-SALPETER EQUATION; D MESONS; LADDER APPROXIMATION; MATRIX ELEMENTS; STRUCTURE FUNCTIONS; WAVE FUNCTIONS

8796 (JINR-D–1-94-278) **A Study of the A Dependence of the Deep Inelastic Scattering of Leptons and Implications for Understanding of the EMC Effect.** Smirnov, G.I. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1994. 12p. Order Number DE95613711. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Yadernaya Fizika.

It is suggested to determine the A dependence of distortions of the nucleon structure function $F_2(x)$ by summing the distortions over the interval (x_1, x_2). It was found from the analysis of the data on deep inelastic scattering of muons and electrons from nuclei that the A dependence of distortion magnitudes obtained in each of the three regions under study, namely shadowing, anti shadowing and the EMC effect region, follow the same functional form, being different in the normalizing factor only. All the available data give evidence for the saturation of the distortion magnitude with rising A. (author). 16 refs.; 5 figs.

8797 (JINR-E–1-94-294) **The Mechanism of Particle Production Process in Hadron-Nucleon Collisions.** Strugalski, Z. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of High Energy. 1994. 10p. Order Number DE95613727. Source: OSTI; NTIS (US Sales Only); INIS.

The mechanism of particle production process in hadron-nucleon collisions has been studied experimentally, using intranuclear detector. Particles are created via intermediate objects decaying into commonly observed resonances and particles after the lifetime more than about 10^{22} s. The appearance of the well-collimated spurts of particles, or jets, in the final state, and of the large transverse momenta are therefore naturally a simple and indispensable consequence of such mechanism of the particle production. 27 refs.

8798 (JINR-E–2-94-221) **Renormcharges in V-A Theories.** Beshtoev, Kh.M. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Computing Techniques and Automation. 1994. 6p. Order Number DE95613689. Source: OSTI; NTIS (US Sales Only); INIS.

It is shown that in the theory of weak interaction there may not exist any group of the renormtransformation of charge (i.e., the charge-g_L remains constant) because this theory can be characterized as a 'left' one, or if such a group exists it is then realized for the charge g_L, and it is not related to the charge g in the vector theory. In connection with the above said there arises a problem of relating the charges g_L and g when constructing the unified theory of interaction. (author). 7 refs.

8799 (JINR-E–2-94-254) **New Tensor Interactions in μ - Decay.** Chizhov, M.V. (Sofia Univ. (Bulgaria)). Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1994. 6p. Order Number DE95613760. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted Modern Physics Letters A.

The most general form of the Hamiltonian for the muon decay is presented. We assume that it arises as a result of the exchange of intermediate bosons with a momentum q and naturally should depend on this momentum. This allows us to introduce two additional coupling constants for the tensor interactions which give rise to new parameters in the energy spectrum of positrons. The experimental consequences of such a generalization are discussed. (author). 11 refs.

8800 (JINR-E–2-94-262) **Spin Effects in pp-Scattering at Diffraction Range and RHIC Energies.** Goloskokov, S.V.; Selyugin, O.V. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1994. 11p. Order Number DE95613728. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Physics Letters. B.

The spin effects in nucleon-nucleon scattering are calculated in the framework of the dynamic model taking into account interactions at large distances and the strong form factors; the model factorization of the NN-amplitude into the spin-dependent hadron-pomeron vertex and high energy spinless pomeron is obtained. Theoretical predictions for polarization and A_{nn} are made for the diffraction range at the RHIC energies. 20 refs., 2 figs., 2 tabs.

8801 (JINR-E–4-94-234) **Spin Momentum Correlation (Handedness) in the Process of Four Pion Production in the Electron-Positron Collisions.** Bratkovskaya, E.L.; Kuraev, E.A.;

Silagadze, Z.K.; Teryaev, O.V. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1994. 10p. Order Number DE95613690. Source: OSTI; NTIS (US Sales Only); INIS.

We discuss a special type of polarization asymmetry ('handedness') in the process e^+e^- -> 4π, when one of the initial particles is longitudinally polarized. The asymmetry is proportional to the degree of polarization and to the width of mass ratio of ρ-meson. It can reach 4-5% in some kinematic region. Both channels 2 π^+ 2 π^- and 2 $\pi^0\pi^+\pi^-$ are considered in the framework of the effective chiral Lagrangian with vector mesons, in the energy range $\approx$ 1.2 GeV. The corresponding total cross sections are also calculated. (author). 11 refs.; 4 figs.

8802 (JINR-R–4-94-280) **On Explanation of Proton Electromagnetic Form Factor Near p anti p-Threshold from the PS-170 Experiment.** Meshcheryakov, V.A.; Meshcheryakov, G.V. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics; Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of High Energy. 1994. 18p. (In Russian). Order Number DE95613766. Source: OSTI; NTIS (US Sales Only); INIS.

A review is given for studies on the data of experiment PS-170. Model-dependence of the approach based on the assumption of the existence of a quasi nuclear state in a p anti p-system is discussed. A previous conclusion on a low binding energy E and small width Γ of the quasi nuclear bound state is confirmed: E $\approx$ Γ $\approx$ 2 MeV. (author). 18 refs., 4 figs., 2 tabs.

8803 (LBL–36353) **Study of $b\bar{b}$ production in e^+e^- annihilation at $\sqrt{s}$ = 29 GeV with the aid of neural networks.** Lambert, D.J. (Univ. of California, Berkeley, CA (United States). Dept. of Physics). Lawrence Berkeley Lab., CA (United States). Nov 1994. 157p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00098. Order Number DE95004691. Source: OSTI; NTIS; INIS; GPO Dep.

The author presents a measurement of $\sigma(b\bar{b})/\sigma(q\bar{q})$ in the annihilation process $e^+e^- \rightarrow q\bar{q} \rightarrow$ hadrons at $\sqrt{s}$ = 29 GeV. The analysis is based on 66 pb^{-1} of data collected between 1984 and 1986 with the TPC/2γ detector at PEP. To identify bottom events, he uses a neural network with inputs that are computed from the 3-momenta of all of the observed charged hadrons in each event. He also presents a study of bias in techniques for measuring inclusive $\pi^{\pm}$, $K^{\pm}$, and $p/\bar{p}$ production in the annihilation process $e^+e^- \rightarrow b\bar{b} \rightarrow$ hadrons at $\sqrt{s}$ = 29 GeV, using a neural network to identify bottom-quark jets. In this study, charged particles are identified by a simultaneous measurement of momentum and ionization energy loss (dE/dx).

8804 (SLAC-PUB–6549) **Measurement of α_s from hadronic event observables at the Z^0 resonance.** Stanford Univ., CA (United States). Jul 1994. 35p. Sponsored by USDOE, Washington, DC (United States);National Science Foundation, Washington, DC (United States);Science and Engineering Research Council, Swindon (United Kingdom);Istituto Nazionale di Fisica Nucleare, Rome (Italy);Japan-US Cooperative Rese DOE Contract AC03-76SF00515 ; FG02-91ER40676 ; FG03-92ER40701 ; FG03-91ER40618 ; FG03-92ER40689 ; FG03-93ER40788 ; FG02-91ER406Grant PHY-91-13428; Grant PHY-89-21320; Grant PHY-92-04239; Gran (CONF-940722–38: 27. international conference on high energy physics, Glasgow (United Kingdom), 21-27 Jul 1994). Order Number DE95005943. Source: OSTI; NTIS; INIS; GPO Dep.

The strong coupling α_s has been measured using hadronic decays of Z^0 bosons collected by the SLD experiment at SLAC. The data were compared with QCD predictions both at fixed order, $O(\alpha_s^2)$, and including resummed analytic formulae based on the leading and next-to-leading logarithm approximation. The authors studied event shapes, jet rates, particle correlations, and energy fraction and checked the consistency between α_s extracted from these different measures. Combining all results they obtain $\alpha_s(M_{Z^0}^2)$ = 0.120 $\pm$ 0.003(exp.) $\pm$ 0.009(theor.), where the dominant uncertainty in α_s is from uncalculated higher order contributions.

8805 (SLAC-PUB–6550) **A search for jet handedness in hadronic Z^0 decays.** Stanford Linear Accelerator Center, Menlo Park, CA (United States). Jul 1994. 10p. Sponsored by USDOE, Washington, DC (United States);National Science Foundation, Washington, DC (United States);Science and Engineering Research Council, Swindon (United Kingdom);Istituto Nazionale di Fisica Nucleare, Rome (Italy);Japan-US Cooperative Rese DOE Contract AC03-76SF00515 ; FG02-91ER40676 ; FG03-92ER40701 ; FG03-91ER40618 ; FG03-92ER40689 ; FG03-93ER40788 ; FG02-91ER406Grant PHY-91-13428; Grant PHY-89-21320; Grant PHY-92-04239; Gran (CONF-940722–37: 27. international conference on high energy physics, Glasgow (United Kingdom), 21-27 Jul 1994). Order Number DE95005944. Source: OSTI; NTIS; INIS; GPO Dep.

The authors have searched for signatures of polarization in hadronic jets from $Z^0 \rightarrow q\bar{q}$ decays using the "jet handedness" method. The charge asymmetry induced by the high SLC electron beam polarization was used to select quark or antiquark jets, expected to be left- and right-polarized, respectively. They find no evidence for jet handedness in their global sample nor in a sample of light quark jets. They set upper limits of 5.1% and 9.1% respectively on the magnitude of the analyzing power of this technique at the 95% C.L. They have studied several alternative definitions of jet handedness and find no signal by any method.

8806 (SLAC-PUB–6591) **Extending the kinematic range for W_R searches in e^-e^- collisions at the NLC.** Rizzo, T.G. Stanford Linear Accelerator Center, Menlo Park, CA (United States). Jul 1994. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-940816–80: Meeting of the Division of Particles and Fields of the American Physical Society, Albuquerque, NM (United States), 2-6 Aug 1994). Order Number DE95005946. Source: OSTI; NTIS; INIS; GPO Dep.

While the much discussed lepton-number violating process $e^-e^- \rightarrow W_R^-W_R^-$ provides an excellent probe of both the Majorana nature of the right-handed neutrino and the symmetry breaking sector of the Left-Right Symmetric Model, it is likely that W_R's are too massive to be pair produced at the NLC with $\sqrt{s}$ in the 1-1.5 TeV range. The author is thus lead to consider the single W_R production process $e^-e^- \rightarrow W_R^-(W_R^-)^* \rightarrow W_R^-$ + jj in order to expand the collider's kinematic reach. After pointing out that W_R's with masses of order 1 TEV may be missed by future hadron collider searches, the author demonstrates that this three-body process possesses a significant cross section, of order several fb, at the NLC with $\sqrt{s}$ in the range above. The angular distribution of the produced W_R's is shown to be essentially flat and the potential backgrounds from standard model processes are shown to be small.

8807 (SLAC-PUB–6597) **A measurement of quark and gluon jet differences at the Z^0 resonance.** Iwasaki, Yoshihito (Tohoku Univ., Sendai (Japan)). Stanford Linear Accelerator Center, Menlo Park, CA (United States). Aug 1994. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-940816–79: Meeting of the Division of Particles and Fields of the American Physical Society, Albuquerque, NM (United States), 2-6 Aug 1994). Order Number DE95005947. Source: OSTI; NTIS; INIS; GPO Dep.

The authors have studied differences between quark and gluon jets using 3-jet events in hadronic decays of Z^0 bosons collected by the SLD experiment at SLAC. Gluon jets were identified in symmetric 3-jet events containing one jet tagged as a heavy quark jet and compared with a mixed sample of quark and gluon jets and also with a mixed sample of light quark (u, d and s) and gluon jets. Their preliminary results show that the particle multiplicity in gluon jets is higher than that in light quark jets. These results are in qualitative agreement with QCD expectations. Differences are also observed in particle energy spectra and the jet widths, consistent with QCD expectations.

8808 (SLAC-PUB–6598) **A test of the flavor independence of strong interactions.** Hildreth, M.D. Stanford Linear Accelerator Center, Menlo Park, CA (United States). Aug 1994. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-940816–76: Meeting of the Division of

Particles and Fields of the American Physical Society, Albuquerque, NM (United States), 2-6 Aug 1994). Order Number DE95005948. Source: OSTI; NTIS; INIS; GPO Dep.

The authors present a comparison of the strong couplings of b, c, and light (u, d, and s) quarks derived from multi-jet rates in flavor-tagged samples of hadronic Z^0 decays recorded with the SLC Large Detector at the SLAC Linear Collider. By comparing the rates of 3-jet events in these three samples they have extracted (Preliminary) values of: $\alpha_s(uds)/\alpha_s(all) = 0.96 \pm 0.03(stat.) \pm 0.04(syst.) \pm 0.02(theory)$, $\alpha_s(c)/\alpha_s(all) = 1.16 \pm 0.11(stat.) \pm 0.10(syst.) \pm 0.07(theory)$, $\alpha_s(b)/\alpha_s(all) = 0.98 \pm 0.04(stat.) \pm 0.08(syst.) \pm 0.02(theory)$.

8809 (SLAC-PUB–6599) **Measurement of α_s from hadronic event observables at the Z^0 resonance.** Ohnishi, Yukiyoshi (Nagoya Univ. (Japan). Dept. of Physics). Stanford Linear Accelerator Center, Menlo Park, CA (United States). Aug 1994. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-940816–77: Meeting of the Division of Particles and Fields of the American Physical Society, Albuquerque, NM (United States), 2-6 Aug 1994). Order Number DE95005949. Source: OSTI; NTIS; INIS; GPO Dep.

The authors have measured the strong coupling α_s using hadronic decays of Z^0 bosons collected by the SLD experiment at SLAC. The data were compared with QCD predictions both at fixed order, $O(\alpha_s^2)$, and including resummed analytic formulae based on the leading and next-to-leading logarithm approximation. The study includes event shapes, jet rates, and particle correlations. They checked the consistency between α_s extracted from these different measures and found the dominant uncertainty on α_s to be from uncalculated higher order contributions.

8810 (SLAC-PUB–6600) **Multiplicity moments in e^+e^- annihilation into hadrons at the Z^0 resonance.** Zhou, J. (Univ. of Oregon, Eugene, OR (United States). Dept. of Physics). Stanford Linear Accelerator Center, Menlo Park, CA (United States); Oregon Univ., Eugene, OR (United States). Dept. of Physics. Aug 1994. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515 ; FG06-85ER40224. (CONF-940816–78: Meeting of the Division of Particles and Fields of the American Physical Society, Albuquerque, NM (United States), 2-6 Aug 1994). Order Number DE95005950. Source: OSTI; NTIS; INIS; GPO Dep.

The authors present the ratio of cumulant to factorial moments of multiplicity distributions in hadronic events from Z^0 decays. Their preliminary result show that this ratio, as a function of moment rank q, decreases sharply to a negative minimum at $q \sim 5$, followed by a sequence of quasi-oscillations. These observed features are in qualitative agreement with expectations from higher-order perturbative QCD.

8811 (SLAC-PUB–6602) **Measurement of the charged multiplicity of $Z^0 \to b\bar{b}$ events.** Burrows, P.N. (Massachusetts Institute of Technology, Cambridge, MA (United States)). Stanford Linear Accelerator Center, Menlo Park, CA (United States). Aug 1994. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-940816–75: Meeting of the Division of Particles and Fields of the American Physical Society, Albuquerque, NM (United States), 2-6 Aug 1994). Order Number DE95006051. Source: OSTI; NTIS; INIS; GPO Dep.

Using an impact parameter tag to select an enriched sample of $Z^0 \to b\bar{b}$ events, the authors have measured the difference between the average charged multiplicity of $Z^0 \to b\bar{b}$ and $Z^0 \to$ hadrons to be $\bar{n}_b - \bar{n}_{had} = 2.24 \pm 0.30(stat.) \pm 0.33(syst.)$ tracks per event. From this, they have derived $\bar{n}_b - \bar{n}_{uds} = 3.31 \pm 0.41 \pm 0.79$. Comparing this measurement with those at lower center-of-mass energies, the authors find no evidence that $\bar{n}_b - \bar{n}_{uds}$ depends on energy, in agreement with a precise prediction of perturbative QCD.

8812 (SLAC-PUB–6639) **Electroweak coupling measurements from polarized Bhabha scattering at the Z^0 resonance.** Pitts, K.T. (Univ. of Oregon, Eugene, OR (United States). Dept. of Physics). Oregon Univ., Eugene, OR (United States). Dept. of Physics; Stanford Univ., CA (United States). Aug 1994. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG06-85ER40224 ; AC03-76SF00515. (CONF-940816–81: Meeting of the Division of Particles and Fields of the American Physical Society, Albuquerque, NM (United States), 2-6 Aug 1994). Order Number DE95006056. Source: OSTI; NTIS; INIS; GPO Dep.

The cross section for Bhabha scattering ($e^+e^- \to e^+e^-$) with polarized electrons at the center of mass energy of the Z^0 resonance has been measured with the SLD experiment at the SLAC Linear Collider (SLC) during the 1992 and 1993 runs. The first measurement of the left-right asymmetry in Bhabha scattering ($A_{LR}e^+e^-(\theta)$) is presented. From $A_{LR}{}^{e^+e^-}(\theta)$ the effective weak mixing angle is measured to be $\sin^2\theta_W{}^{eff} = 0.2245 \pm 0.0049 \pm 0.0010$. The effective electron vector and axial vector couplings to the Z^0 are extracted from a combined analysis of the polarized Bhabha scattering data and the left-right asymmetry (A_{LR}) previously published by this collaboration. From the combined 1992 and 1993 data the effective electron couplings are measured to be $v_e = -0.0414 \pm 0.0020$ and $a_e = -0.4977 \pm 0.0045$.

8813 (SLAC-PUB–6645) **A search for jet handedness in hadronic Z^0 decays.** Masuda, Hiroaki. Stanford Linear Accelerator Center, Menlo Park, CA (United States). Sep 1994. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-9407142–4: ICHEP '94, Glasgow (United Kingdom), 20-27 Jul 1994). Order Number DE95006058. Source: OSTI; NTIS; INIS; GPO Dep.

The authors have searched for signatures of polarization in hadronic jets from $Z^0 \to q\bar{q}$ decays using the 'jet handedness' method. The charge asymmetry induced by the high SLC electron beam polarization was used to select quark or antiquark jets, expected to be left- and right-polarized, respectively. From the authors preliminary study, they find no evidence for jet handedness in their global sample nor in a sample of light quark jets. Assuming Standard Model values of quark polarizations, they set upper limits of 5.1% and 9.1% (preliminary), respectively, on the magnitude of the analyzing power of this technique at the 95% C.L. They have studied several alternative definitions of jet handedness and find no signal by any method.

8814 (SLAC-PUB–6647) **A search for jet handedness in hadronic Z^0 decays.** Hasegawa, Y. (Tohoku Univ., Sendai (Japan). Dept. of Physics). Stanford Univ., CA (United States). Aug 1994. 4p. Sponsored by USDOE, Washington, DC (United States);Japan-US Cooperative Research Project on High Energy Physics, Nagoya (Japan). DOE Contract AC03-76SF00515. (CONF-9407135–4: QCD 94: nuclear physics B, Montpellier (France), 7-13 Jul 1994). Order Number DE95006060. Source: OSTI; NTIS; INIS; GPO Dep.

The authors have searched for signatures of polarization of partons in hadronic jets from $Z^0 \to q\bar{q}$ decays using the "jet handedness" method. They find no evidence for jet handedness in a sample of light quark jets. They set an upper limit of 9.1% on magnitude of the analyzing power of this technique at the 95% C.L. They have studied an alternative definition of jet handedness and found no signal.

8815 (SLAC-PUB–6648) **The left-right forward-backward asymmetry of heavy quarks measured with jet charge and with leptons at the SLD.** Williams, D.C. (Massachusetts Institute of Technology, Cambridge, MA (United States)). Stanford Linear Accelerator Center, Menlo Park, CA (United States). Oct 1994. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-940816–71: Meeting of the Division of Particles and Fields of the American Physical Society, Albuquerque, NM (United States), 2-6 Aug 1994). Order Number DE95006145. Source: OSTI; NTIS; INIS; GPO Dep.

The authors present direct measurements of the left-right asymmetry of b- and c-quarks from the decay of Z^0 bosons produced in the annihilation of longitudinally polarized electrons and unpolarized positrons. Two complementary techniques are presented: (1) $Z^0 \to b\bar{b}$ decays are tagged using track impact parameters with $b\bar{b}$ discrimination provided by momentum-weighted track charge; (2) semileptonic b-decays are tagged using high p and p_T muons and electrons. The preliminary results from their 1993 data sample are: $A_b = 0.93 \pm 0.13 \pm 0.13$ for the jet charge and $A_b = 0.93 \pm 0.14 \pm 0.09$, and $A_c = 0.40 \pm 0.23 \pm 0.20$ for the leptons, where the first error is statistical and the second systematic.

8816 (SLAC-PUB–6653) **A measurement of the left-right, forward-backward asymmetry for charm quarks using D^{*+} and D^+ mesons.** King, M.E. Stanford Linear Accelerator Center, Menlo Park, CA (United States). Sep 1994. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-940816–73: Meeting of the Division of Particles and Fields of the American Physical Society, Albuquerque, NM (United States), 2-6 Aug 1994). Order Number DE95006061. Source: OSTI; NTIS; INIS; GPO Dep.

Longitudinal polarization of the SLC e^- beam allows a direct measurement of the left-right, forward-backward asymmetry of c-quarks to be made with the SLD. Events from $Z^0 \rightarrow c\bar{c}$ are tagged using fully and partially reconstructed decays of D^{*+} mesons, and fully reconstructed decays of D^+ mesons. The authors measure $A_c = 0.77 \pm 0.22(\text{stat.}) \pm 0.10(\text{syst.})$.

8817 (SLAC-PUB–6659) **A test of the flavor independence of strong interactions.** Markiewicz, T.W. Stanford Linear Accelerator Center, Menlo Park, CA (United States). Sep 1994. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-9407135–3: QCD 94: nuclear physics B, Montpellier (France), 7-13 Jul 1994). Order Number DE95006063. Source: OSTI; NTIS; INIS; GPO Dep.

The authors present a comparison of the strong couplings of b, c, and light (u, d, and s) quarks derived from multi-jet rates in flavor-tagged samples of hadronic Z^0 decays recorded with the SLC Large Detector at the SLAC Linear Collider. By comparing the rates of 3-jet events in these three samples they have extracted the Preliminary values of: $\alpha_s(\text{uds})/\alpha_s(\text{all}) = 0.96 \pm 0.03(\text{stat.}) \pm 0.04(\text{syst.}) \pm 0.02(\text{theory})$, $\alpha_s(\text{c})/\alpha_s(\text{all}) = 1.16 \pm 0.11(\text{stat.}) \pm 0.10(\text{syst.}) \pm 0.07(\text{theory})$, $\alpha_s(\text{b})/\alpha_s(\text{all}) = 0.98 \pm 0.04(\text{stat.}) \pm 0.08(\text{syst.}) \pm 0.02(\text{theory})$.

8818 (SLAC-PUB–6674) **Probing new physics in rare charm processes.** Hewett, J.L. Stanford Linear Accelerator Center, Menlo Park, CA (United States). Sep 1994. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-940816–69: Meeting of the Division of Particles and Fields of the American Physical Society, Albuquerque, NM (United States), 2-6 Aug 1994). Order Number DE95006067. Source: OSTI; NTIS; INIS; GPO Dep.

The possibility of using the charm system to search for new physics is addressed. Phenomena such as D^0 - $\bar{D}^0$ mixing and rare decays of charmed mesons are first examined in the Standard Model to test the present understanding and to serve as benchmarks for signals from new sources. The effects of new physics from various classes of non-standard dynamical models on D^0 - $\bar{D}^0$ mixing are investigated.

8819 (UM-P–92/92) **CP violation in hyperon decays: the case p-bar p $\rightarrow$ Λ-bar Λ $\rightarrow$ p-bar π^+ pπ^-.** Hamann, N. (European Organization for Nuclear Research, Geneva (Switzerland)); He, X.G.; Landua, R.; Ohlsson, S.; Steger, H.; Valencia, G.; Fischer, H.; Geyer, R.; Hertzog, D.; Kolo, B.; Miller, J.P.; Rohrich, K. European Organization for Nuclear Research, Geneva (Switzerland); Melbourne Univ., Parkville, VIC (Australia). School of Physics. 30 Mar 1992. 48p. (CERN/SPSLC–92/19; SPSLC/M–491.). Order Number DE95616347. Source: OSTI; NTIS (US Sales Only); INIS.

CP-Hyperon Study Group: Report to the SPS and LEAR Experiments Committee.

An account is given of the experimental status of CP violation and of the phenomenology of hyperon non-leptonic decays. Updated information on the estimate of CP-violating observable in these decays is presented. An experimental programme is outlined, which aims to pursue the search for direct CP violation in hyperon-antihyperon decays by means of the reaction p-bar p $\rightarrow$ Λ-bar Λ $\rightarrow$ p-bar π^+ pπ^-. The experiment as well as analysis methods are described. Alternative approaches employing hyperons are also discussed. 54 refs., 1 tab., 13 figs.

8820 (UM-P–93/84) **Density dependent effective interactions.** Dortmans, P.J.; Amos, K. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 21p. Order Number DE95616348. Source: OSTI; NTIS (US Sales Only); INIS.

An effective nucleon-nucleon interaction is defined by an optimal fit to select on-and half-off-of-the-energy shell t-and g-matrices determined by solutions of the Lippmann-Schwinger and Brueckner-Bethe-Goldstone equations with the Paris nucleon-nucleon interaction as input. As such, it is seen to better reproduce the interaction on which it is based than other commonly used density dependent effective interactions. The new (medium modified) effective interaction when folded with appropriate density matrices, has been used to define proton-^{12}C and proton-^{16}O optical potentials. With them elastic scattering data are well fit and the medium effects identifiable. 23 refs., 8 figs.

8821 (UM-P–93/88) **Coulomb correction calculations of pp Bremsstrahlung.** Katsogiannis, A. (Melbourne Univ., Parkville, VIC (Australia). School of Physics); Amos, K.; Jetter, M.; von Geramb, H.V. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 38p. Order Number DE95616349. Source: OSTI; NTIS (US Sales Only); INIS.

The effects of the Coulomb interaction upon the photon cross section and analyzing power from pp Bremsstrahlung have been studied in detail. Off-shell properties of the Coulomb T matrices have been considered but the associated, Coulomb modified, hadronic T matrices are important elements in any analyses of low energy, forward proton scattering data. At the lowest energy considered (5 MeV), the full calculations gave cross sections that were half the size of those found without Coulomb effects or with a simple model approximation to them. With increasing energy, the cross sections varied to those characteristic of magnetic interaction dominance and the specific differences due to Coulomb effects diminished. 47 refs., 7 figs.

8822 (UM-P–94/63) **The search for the decay of Z boson into two gamma as a test of Bose statistics.** Ignatiev, A.Yu. (Melbourne Univ., Parkville, VIC (Australia). School of Physics); Joshi, G.C.; Matsuda, M. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 9p. Sponsored by Australian Research Council, Canberra, ACT (Australia). (RCHEP–94/17.). Order Number DE95616373. Source: OSTI; NTIS (US Sales Only); INIS.

It is suggested that Bose statistics for photons can be tested by looking for decays of spin-1 bosons into two photons. The experimental upper limit on the decay $Z \rightarrow \gamma\gamma$ is used to establish for the first time the quantitative measure of the validity of Bose symmetry for photons. 38 refs.

6624 Properties of Specific Particles and Resonances

Refer also to citation(s) 8747, 8753, 8755, 8792, 8847, 8867, 8926

8823 (ANL-HEP-CP–94-82) **Long-baseline neutrino oscillation experiments.** Crane, D.; Goodman, M. Argonne National Lab., IL (United States). [1994]. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9406269–3: Snowmass 94: particle and astrophysics in the next millenium, Snowmass, CO (United States), 29 Jun - 14 jul 1994). Order Number DE95004636. Source: OSTI; NTIS; INIS; GPO Dep.

There is no unambiguous definition for long baseline neutrino oscillation experiments. The term is generally used for accelerator neutrino oscillation experiments which are sensitive to $\Delta m^2 < 1.0$ eV^2, and for which the detector is not on the accelerator site. The Snowmass N2L working group met to discuss the issues facing such experiments. The Fermilab Program Advisory Committee adopted several recommendations concerning the Fermilab neutrino program at their Aspen meeting immediately prior to the Snowmass Workshop. This heightened the attention for the proposals to use Fermilab for a long-baseline neutrino experiment at the workshop. The plan for a neutrino oscillation program at Brookhaven was also thoroughly discussed. Opportunities at CERN were considered, particularly the use of detectors at the Gran Sasso laboratory. The idea to build a neutrino beam from KEK towards Superkamiokande was not discussed at the Snowmass meeting, but there has been considerable development of this idea since then. Brookhaven and KEK would use low energy neutrino beams, while FNAL and CERN would plan have medium energy beams. This report will summarize a few topics common to LBL

proposals and attempt to give a snapshot of where things stand in this fast developing field.

8824 (BNL–61099) **Baryon spectroscopy and the omega minus.** Samios, N.P. Brookhaven National Lab., Upton, NY (United States). [1994]. 22p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-9407157–1: International conference on the history of original ideas and basic discoveries in particle physics, Erice (Italy), 29 Jul - 4 aug 1994). Order Number DE95004838. Source: OSTI; NTIS; INIS; GPO Dep.

In this report, I will mainly discuss baryon resonances with emphasis on the discovery of the Ω^-. However, for completeness, I will also present some data on the meson resonances which together with the baryons led to the uncovering of the SU(3) symmetry of particles and ultimately to the concept of quarks.

8825 (BNL–61141) **Tau physics 1994: A theoretical perspective.** Marciano, W.J. Brookhaven National Lab., Upton, NY (United States). Nov 1994. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-9409277–2: 3. workshop on tau lepton physics, Montreux (Switzerland), 19-22 Sep 1994). Order Number DE95004840. Source: OSTI; NTIS; INIS; GPO Dep.

In this paper I describe some recent advances in tau physics and discuss their implications from a theoretical perspective. The examples I have chosen include e-μ-τ universality, QCD studies, anomalous electroweak dipole moments, and forbidden decays. That list is by no means exhaustive. It should, however, demonstrate the breath of tau physics, describe some interesting new results, and point out the potential for future advances.

8826 (DOE/ER/40561–172) **The off-shell axial anomaly via the $\gamma^*\pi^0 \rightarrow \gamma$ transition.** Frank, M.R. (Univ. of Washington, Seattle, WA (United States). Institute for Nuclear Theory); Mitchell, K.L.; Tandy, P.C.; Roberts, C.D. Washington Univ., Seattle, WA (United States). Inst. for Nuclear Theory; Argonne National Lab., IL (United States). [1995]. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG06-90ER40561 ; W-31109-ENG-38. National Science Foundation Grant PHY-91-13117; National Science Order Number DE95004762. Source: OSTI; NTIS; INIS; GPO Dep.

The $\gamma^*\pi^0 \rightarrow \gamma$ form factor, including the extension off the pion mass-shell, is obtained from a generalized impulse approximation within a QCD-based model field theory known to provide an excellent description of the pion charge form factor. This approach implements dressing of the vertex functions and propagators consistent with dynamical chiral symmetry breaking, gauge invariance, quark confinement and perturbative QCD. Soft nonperturbative behavior, dictated by the axial anomaly, is found to evolve to the perturbative QCD limit only for $Q^2 \geq 20$ GeV^2.

8827 (FNAL/C–94/337-E) **W-charge asymmetry at CDF, tests of structure functions.** Budd, H.S. (Univ. of Rochester, NY (United States). Dept. of Physics and Astronomy). Fermi National Accelerator Lab., Batavia, IL (United States). Sep 1994. 3p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH03000. (CONF-9407142–6: ICHEP '94, Glasgow (United Kingdom), 20-27 Jul 1994). Order Number DE95004855. Source: OSTI; NTIS; INIS; GPO Dep.

The charge asymmetry of W-bosons produced in $p\bar{p}$ collisions has been measured using 19,039 $W \rightarrow e\nu$ and $W \rightarrow \mu\nu$ decays recorded by the CDF detector during the 1992-93 Tevatron collider run. The asymmetry is sensitive to the slope of the proton's d/u quark distribution ratio down to $x < 0.01$ at $Q^2 \approx M_W{}^2$, where nonperturbative QCD effects are minimal. Of recent parton distribution functions, those of Martin, Roberts and Stirling are favored over those of the CTEQ collaboration. This difference is seen even though both sets agree, at the level of the nuclear shadowing corrections, with the recent NMC measurements of $F_2{}^{\mu n}/F_2{}^{\mu p}$.

8828 (FNAL/C–94/368-E) **Top quark kinematics and mass determination.** Williams, H.H. Fermi National Accelerator Lab., Batavia, IL (United States). Oct 1994. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH03000. (CONF-9407142–5: ICHEP '94, Glasgow (United Kingdom), 20-27 Jul 1994). Order Number DE95004853. Source: OSTI; NTIS; INIS; GPO Dep.

An analysis is presented of 10 W + $\geq$ 3 jet events, each with evidence for the presence of a b quark, that were recently observed by the CDF collaboration. Seven of these events include a fourth jet and can be explicitly reconstructed as $t\bar{t}$ production. The best estimate of the top quark mass is $M_t = 174 \pm 10_{-12}{}^{+13}$ GeV/c^2. A study has also been performed to see if the kinematical properties of events with W + $\geq$ 3 jets gives evidence for top production. An excess of events with large jet energies, compared to that expected from direct production of W + $\geq$ 3 jets, is observed. A large fraction of these events also contain a b-quark and a fourth jet.

8829 (GANIL–T–94-02) **Interferometry of hard photons in heavy-ion collisions.** Ostendorf, R.W. Grand Accelerateur National d'Ions Lourds (GANIL), 14 - Caen (France). Oct 1993. 162p. (In French). Order Number DE95613797. Source: OSTI; NTIS (US Sales Only); INIS.

Heavy ion collisions offer the unique opportunity to study interference effects between independent hard photons (energies above 25 MeV). The theoretical basis of interference is presented in the framework of classical as well as quantum theory. Experiments use the photon spectrometer TAPS, a modular array of BaF_2 crystals covering 30% of the solid angle. The properties of the spectrometer and the data analysis techniques are described for the experiment $^{129}Xe + {}^{197}Au$ at 44 MeV/u, the very first dedicated to the study of photon correlation function. Data are interpreted using GEANT3 simulations to analyse the effect of the method as well as the response function of the photon spectrometer. A second experiment, $^{86}Kr + {}^{58}Ni$ at 60 MeV/u is described briefly, where for the first time the existence of an interference effect between hard photons is observed. 52 figs., 76 refs.

8830 (IC–94/280) **Supersymmetric magnetic moments sum rules and spontaneous supersymmetry breaking.** Khalil, S.S. International Centre for Theoretical Physics, Trieste (Italy). Sep 1994. 12p. Order Number DE95613771. Source: OSTI; NTIS (US Sales Only); INIS.

In supersymmetry the anomalous magnetic moment of particles belonging to the same supermultiplet is related by simple sum rules. We study the modification of these sum rules in the case of the spontaneously broken N=1 global supersymmetry. (author). 9 refs, 3 figs.

8831 (IC–94/303) **Signatures of virtual LSPs at the TEVATRON.** Datta, A. (International Centre for Theoretical Physics, Trieste (Italy)); Chakravarti, S.; Guchait, M. International Centre for Theoretical Physics, Trieste (Italy). Oct 1994. 9p. (HEPPH–9410331.). Order Number DE95613798. Source: OSTI; NTIS (US Sales Only); INIS.

Relatively light sneutrinos which are experimentally allowed and are not theoretically disfavored may significantly affect the currently popular search strategies for supersymmetric particles by decaying dominantly into an invisible channel. In certain cases the second lightest neutralino may also decay invisibly leading to two extra carriers of missing energy (in addition to the lightest supersymmetric particle (LSP)) - the virtual LSPs (VLSPs). The lighter charginos which would be produced in pairs with reasonably large cross-sections at TEVATRON energies, decay dominantly into the hadronically quiet lepton + sneutrino (E_T) modes with large branching ratios leading to interesting unlike sign dilepton events which are not swamped by the standard model background. The kinematical cuts required to eliminate the backgrounds from WW, Drell-Yan and τ pair production are discussed in detail. With 100 pb^{-1} luminosity 10-35 background free events can be found in a large region of the SUSY parameter space. (author). 14 refs, 3 figs, 2 tabs.

8832 (IHEP–93-100) **Search for exotic baryons with the SPHINX facility.** Landsberg, L.G. Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov (Russian Federation). Inst. Fiziki Vysokikh Ehnergij. 1993. 12p. (IFVE–93-100.). Order Number DE95613774. Source: OSTI; NTIS (US Sales Only); INIS.

In the experiments at the SPHINX facility in the proton beam of the IHEP accelerator (E_p=70 GeV) a number of diffractive production reactions were studied. Among them are $p+N \rightarrow (K^+K^-p) + N$,

p+N→ (ϕp) + N, p+N→[Λ(1520)K^+] + n, p+N→[Σ(1385)$^0K^+$] + N, as well as some other processes. The results of the search for narrow heavy baryon states, candidates for the cryptoexotic hadrons with hidden strangeness, are presented. 15 refs., 5 figs., 1 tab.

8833 (INIS-mf–14440, pp. 2) **The discovery of t quark.** Ardalan, F. Iranian Physics Society, Teheran (Iran, Islamic Republic of); Sharif Univ. of Technology, Teheran (Iran, Islamic Republic of). Dept. of Physics. Aug 1994. 91p. (In English, Persian). (CONF-9408203–: Annual physics conference of Iran, Sanandaj (Iran, Islamic Republic of), 19 Aug - 1 sep 1994). In *Abstracts of annual physics conference of Iran, 1373 Kordestan University*. Order Number DE95611717. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. QUARKS; FERMILAB TEVATRON; MASS; QUARKS; STANDARD MODEL

8834 (INIS-mf–14440, pp. 4) **Toponium energy levels.** Golshani, A.; Kummer, W.; Moeddritsch, W. Iranian Physics Society, Teheran (Iran, Islamic Republic of); Technische Univ., Vienna (Austria). 1. Inst. fuer Theoretische Physik. Aug 1994. 91p. (In English, Persian). (CONF-9408203–: Annual physics conference of Iran, Sanandaj (Iran, Islamic Republic of), 19 Aug - 1 sep 1994). In *Abstracts of annual physics conference of Iran, 1373 Kordestan University*. Order Number DE95611717. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. TOPONIUM/energy levels; PERTURBATION THEORY; TOPONIUM

8835 (JINR-E–2-94-307) **Instantaneous Chiral Quark Model for Relativistic Mesons in a Hot and Dense Medium.** Blaschke, D. (Rostock Univ. (Germany)); Kalinovskij, Yu.L.; Roepke, G.; Schmidt, S.; Muenchow, L.; Pervushin, V.N. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics; Rostock Univ. (Germany). 1994. 27p. Order Number DE95613782. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Nuclear Physics. A.

A chiral quark model with covariant instantaneous interactions is formulated using relativistic thermodynamic Green functions. The approach is applied to the description of mesons as relativistic bound state in hot and dense quark matter. The Schwinger-Dyson equation for the quark mass operator is obtained for a covariant four-point interaction kernel. The Salpeter equations for quark-antiquark bound states in a two-component relativistic quark plasma are given in the scalar-pseudoscalar as well as vector-axial-vector channels. The case of nonvanishing total momentum of bound state relative to the medium is considered. Numerical results for the meson mass spectrum and the pion decay constant at finite temperature are presented for the special case of a separable interaction which can be applied to the case of more realistic potentials. 36 refs., 7 figs.

8836 (JINR-R–2-94-243) **Multichannel Resonances in Coupled Channels of Meson Scattering: Scalar Sector.** Krupa, D. (Slovenska Akademia Vied, Bratislava (Slovakia). Fyzikalny Ustav); Meshcheryakov, V.A.; Surovtsev, Yu.S. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1994. 22p. (In Russian). Order Number DE95613783. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Yadernaya Fizika.

The method to obtain the model-independent values of multichannel-resonance parameters is formulated for determining their QCD nature. The approach is based on the immediate application of such general principles, as analyticity and unitarity, to the analysis of experimental data on the coupled processes of particle scattering. The resonance representation by pairs of complex conjugate clusters of poles and zeros on the Riemann surfaces of the 2- and 3-channel S-matrices are discussed. The multi sheet structure of the Riemann surfaces is taken into account through the choice of proper uniformizing variables. The method permits, on the basis of the analysis on one process, to predict the remaining coupled-process amplitudes. This can be made in two manners: using the analytical continuations of S-matrix to all the unphysical sheets of the Riemann surface and the formulae of the Le Couteur-Newton type. The role of closed channels in forming the resonances is investigated in both the K- and S-matrix approaches. The method is concretized with the isoscalar s-wave channel of coupled processes $\pi\pi$ -> $\pi\pi$, K K, $\eta\eta$ and of scalar resonances. (author). 36 refs.; 6 figs.; 4 tabs.

8837 (LYCEN-T–9416) **Measurement of the semi-leptonic branching ratio and the baryonic contribution in b quark disintegrations.** Vincent, P. Lyon-1 Univ., 69 - Villeurbanne (France). Inst. de Physique Nucleaire. Apr 1994. 175p. (In French). Order Number DE95613799. Source: OSTI; NTIS (US Sales Only); INIS.

The b quark semi-leptonic branching ratios are measured using the hadronic events containing one or two leptons. 950 000 Z^0 hadronic disintegrations were obtained in the DELPHI experiment during 1991-1992. Thus one of the elements of the CKM matrix may be determined. Using information contained in hadron jets with two opposite-sign leptons, the cascade ratios of the beauty hadron semi-leptonic disintegrations are evaluated. The baryon production rate in beauty events is analyzed, and the charmed Lambda baryon production cross-section is measured. 93 figs., 23 tabs., 75 refs.

8838 (SLAC-PUB–6290) **Squark mass determination at a future linear collider.** Feng, J.; Finnell, D. Stanford Linear Accelerator Center, Menlo Park, CA (United States). Jul 1993. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-9304229–2: 2. international workshop on physics and experiments at linear e^+e^- colliders; European workshop at DESY, Waikoloa, HI (United States), 26 Apr - 3 may 1993). Order Number DE95005938. Source: OSTI; NTIS; INIS; GPO Dep.

Present mass limits allow the possibility that squarks may be produced at future linear e^+e^- colliders. In this talk the authors discuss the prospects for precision studies of squark masses at such a facility. Both direct and cascade decay scenarios are discussed. By exploiting the clean environment and polarizable beams of linear e^+e^- colliders, they find that squark mass determinations at the level of a few GeV are possible for a number of regions in parameter space.

8839 (SLAC-PUB–6584) **The discovery of the tau lepton: Part 1, The early history through 1975; Part 2, Confirmation of the discovery and measurement of major properties, 1976–1982.** Perl, M.L. Stanford Linear Accelerator Center, Menlo Park, CA (United States). Aug 1994. 18p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-9407157–2: International conference on the history of original ideas and basic discoveries in particle physics, Erice (Italy), 29 Jul - 4 aug 1994). Order Number DE95005945. Source: OSTI; NTIS; INIS; GPO Dep.

Several previous papers have given the history of the discovery of the τ lepton at the Stanford Linear Accelerator Center (SLAC). These papers emphasized (a) the experiments which led to our 1975 publication of the first evidence for the existence of the τ, (b) the subsequent experiments which confirmed the existence of the r, and (c) the experiments which elucidated the major properties of the τ. That history will be summarized in Part 2 of this talk. In this Part 1, I describe the earlier thoughts and work of myself and my colleagues at SLAC in the 1960's and early 1970's which led to the discovery. I also describe the theoretical and experimental events in particle physics in the 1960's in which our work was immersed. I will also try to describe for the younger generations of particle physicists, the atmosphere in the 1960's. That was before the elucidation of the quark model of hadrons, before the development of the concept of particle generations The experimental paths to program we hot as clear as they are today and we had to cast a wide experimental net.

8840 (SLAC-PUB–6730) **Tau physics at future facilities.** Perl, M.L. Stanford Linear Accelerator Center, Menlo Park, CA (United States). Dec 1994. 14p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-9409277–1: 3. workshop on tau lepton physics, Montreux (Switzerland), 19-22 Sep 1994). Order Number DE95006071. Source: OSTI; NTIS; INIS; GPO Dep.

This paper dicusses and projects the tau research which may be carried out at CESR, at BEPC, at the SLC, in the next few years at LEP I, at the asymmetric B-factories under construction in Japan and the United States and, if built, a tau-charm factory. As the size of tau data sets increases, there is an increasing need to reduce

the effects of systematic errors on the precision and search range of experiments. In most areas of tau physics there is a large amount of progress to be made, but in a few areas it will be difficult to substantially improve the precision of present measurements.

8841 (UM-P–93/117) **Top quark and Higgs boson masses from wormhole physics.** Harris, B.A.; Joshi, G.C. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 29p. Order Number DE95616384. Source: OSTI; NTIS (US Sales Only); INIS.

This paper, brings together quantum field theory on S_4 with the Coleman wormhole hypothesis, which imposes constraints on terms in the gravitational Lagrangian. In particular, it investigates the effect of matter fields on the trace anomaly, which is related to the curvature terms, by the use of the renormalization group equations. A toy model of a non-conformally coupled Higgs boson to a single top quark is considered. By numerically solving the renormalization group equations for the couplings of the model, preferred values of the particle masses were found for various values of the bare non-conformal coupling. By making the ad-hoc assumption that the tree-level, Higgs boson trace anomaly, vanishes on shell, a unique prediction can be made within this model for the masses of both the Higgs and the Top. 20 refs., 12 figs.

8842 (UM-P–94/19) **Possible reason why leptons are lighter than quarks.** Volkas, R.R. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 9p. Sponsored by Australian Research Council, Canberra, ACT (Australia). (OZ–94/6.). Order Number DE95616383. Source: OSTI; NTIS (US Sales Only); INIS.

The minimal model of spontaneously broken leptonic colour and discrete quark-lepton symmetry predicts that charged leptons have the same masses as their partner charge +2/3 quarks up to small radiative corrections. By invoking a different pattern of symmetry braking, a similar model can be constructed with the structural feature that charged leptons have to be lighter than their partner quarks because of fermion mixing effects. As well as furnishing a new model-building tool, this is phenomenologically interesting because the scale of the new physics responsible for the quark-lepton mass hierarchy could be as low as several hundred GeV. 8 refs.

6630 Nuclear Physics

8843 (CNIC–00750, pp. 67-72) **Progress on Chinese evaluated nuclear parameter library (CENPL) (II).** Su Zhongdi (Chinese Nuclear Data Center, Beijing, BJ (China)); Ge Zhigang; Zhou Chunmei. China Nuclear Information Centre, Beijing, BJ (China); Chinese Nuclear Data Center, Beijing, BJ (China). Jun 1993. (CNDC–0012; INDC(CPR)–030/L.). In *Communication of nuclear data progress: No.9 (1993).* 113p. Order Number DE95613323. Source: OSTI; NTIS (US Sales Only); INIS.

CENPL collected, evaluated and compiled nuclear basic constants and model parameters. CENPL-1 contain six sub-libraries, they are: (1) Atomic masses and characteristic constants for nuclear ground states; (2) discrete level schemes and branch ratios of γ decay; (3) level density parameters; (4) giant dipole resonance parameters for γ-ray strength function (5) fission barrier parameter; (6) optical model parameters. Their progresses are introduced.

8844 (LBL–35768) **Nuclear Science Division: 1993 Annual report.** Myers, W.D. (ed.). Lawrence Berkeley Lab., CA (United States). Jun 1994. 200p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00098. Order Number DE95006730. Source: OSTI; NTIS; INIS; GPO Dep.

This report describes the activities of the Nuclear Science Division for the 1993 calendar year. This was another significant year in the history of the Division with many interesting and important accomplishments. Activities for the following programs are covered here: (1) nuclear structure and reactions program; (2) the Institute for Nuclear and Particle Astrophysics; (3) relativistic nuclear collisions program; (4) nuclear theory program; (5) nuclear data evaluation program, isotope project; and (6) 88-inch cyclotron operations.

6631 Nuclear Structure

Refer also to citation(s) 8796, 8943

8845 (ANL/PHY/CP–84452) **Twenty five years of clusters – from Bochum to Strasbourg.** Betts, R.R. (Argonne National Lab., IL (United States)). Argonne National Lab., IL (United States). [1994]. 15p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-940974–2: Meeting on clusters in nuclear structures and dynamics, Strasbourg (France), 6-9 Sep 1994). Order Number DE95005841. Source: OSTI; NTIS; INIS; GPO Dep.

Developments in the area of clustering aspects of nuclear structure and reactions over the past twenty-five years are reviewed. The viewpoint is that the nucleus is an assembly of clusters. The question is whether clusters actually exist in the nucleus. Although there is abundant evidence for this in light nuclei, the situation for more complex clusters in heavier nuclei is much worse. Differential cross sections for scattering of alpha particles and heavy ions are shown.

8846 (ANL/PHY/CP–84543) **Experimental searches for exotic alpha-cluster configurations.** Wuosmaa, A.H. (Argonne National Lab., IL (United States). Physics Div.). Argonne National Lab., IL (United States). [1994]. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-940974–1: Meeting on clusters in nuclear structures and dynamics, Strasbourg (France), 6-9 Sep 1994). Order Number DE95004610. Source: OSTI; NTIS; INIS; GPO Dep.

Exotic and unusual shapes have recently been suggested to occur in light nuclei composed of alpha particle sub-units. Typically, these occur at very high excitation energy, where the nucleus is unbound with respect to decay into many charged particles. As a result these structures have been generally inaccessible to experiments conducted using conventional nuclear physics techniques. A new generation of detector devices now permits the simultaneous detection of many charged particles emerging from such an event with high efficiency, combined with excellent spatial and energy resolution. Such measurements for the first time allow the author to make detailed experimental tests of theoretical predictions of extremely deformed alpha-cluster nuclei. He applies these techniques to the study of extremely deformed configurations predicted to exist at high excitation energy in the nucleus ^{24}Mg.

8847 (BUDKERINP–93-95) **Mixing phases of unstable two-level systems.** Sokolov, V.V. (AN SSSR, Novosibirsk (Russian Federation). Inst. Yadernoj Fiziki); Brentano, P. von. AN SSSR, Novosibirsk (Russian Federation). Inst. Yadernoj Fiziki. 1993. 15p. (IYaF–93-95.). Order Number DE95613844. Source: OSTI; NTIS (US Sales Only); INIS.

An unstable two-level system decaying into an arbitrary number of channels is considered. It is shown that the mixing phases of the two overlapping resonances can be expressed in the terms of their partial widths and one additional universal mixing parameter. Some applications to a doublet of 2^+ resonances in ^{8}Be and to the ρ-ω systems are considered. 18 refs.

8848 (BUDKERINP–93-115) **Nuclear anapole moments in single-particle approximation.** Dmitriev, V.F.; Khriplovich, I.B.; Telitsin, V.B. AN SSSR, Novosibirsk (Russian Federation). Inst. Yadernoj Fiziki. 1994. 25p. (IYaF–93-115.). Order Number DE95613843. Source: OSTI; NTIS (US Sales Only); INIS.

Nuclear anapole moments of ^{133}Cs, ^{203,205}Tl, ^{207}Pb, ^{209}Bi are treated in the single-particle approximation. Analytical results are obtained for the oscillator potential without spin-orbit interaction. Then the anapole moments are calculated numerically in a Woods-Saxon potential which includes spin-orbit interaction. 26 refs., 1 fig., 3 tabs.

8849 (BUDKERINP–94-47) **Nuclear magnetic quadrupole moments in single-particle approximation.** Dmitriev, V.F.; Khriplovich, I.B.; Telitsin, V.B. AN SSSR, Novosibirsk (Russian Federation). Inst. Yadernoj Fiziki. 1994. 11p. Order Number DE95613845. Source: OSTI; NTIS (US Sales Only); INIS.

Static magnetic quadrupole moment of a nucleus, induced by T- and P-odd nucleon-nucleon interaction, is investigated in the single-particle approximation. Models are considered allowing for

analytical solution. The problem is also treated numerically in a Woods-Saxon potential with spin-orbit interaction. The stability of results is discussed. 11 refs., 1 fig., 1 tab.

8850 (CNIC–00750, pp. 58) **Progress on nuclear structure and decay data evaluation for A-chain in China.** Zhou Chunmei (Chinese Nuclear Data Center, Beijing, BJ (China)). China Nuclear Information Centre, Beijing, BJ (China); Chinese Nuclear Data Center, Beijing, BJ (China). Jun 1993. (CNDC–0012; INDC(CPR)–030/L.). In *Communication of nuclear data progress: No.9 (1993).* 113p. Order Number DE95613323. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. NUCLEAR DECAY/data; NUCLEAR DECAY/progress report; NUCLEAR STRUCTURE/data; NUCLEAR STRUCTURE/progress report; CHINA; EVALUATION; MASS NUMBER; DATA

8851 (CNIC–00750, pp. 59) **Nuclear data sheets update for A = 61.** Zhou Chunmei (Chinese Nuclear Data Center, Beijing, BJ (China)). China Nuclear Information Centre, Beijing, BJ (China); Chinese Nuclear Data Center, Beijing, BJ (China). Jun 1993. (CNDC–0012; INDC(CPR)–030/L.). In *Communication of nuclear data progress: No.9 (1993).* 113p. Order Number DE95613323. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. COBALT 61/evaluated data; COPPER 61/evaluated data; GALLIUM 61/evaluated data; IRON 61/evaluated data; NICKEL 61/evaluated data; ZINC 61/evaluated data; BNL; MASS NUMBER; NUCLEAR DECAY; NUCLEAR REACTIONS

8852 (CNIC–00750, pp. 60-66) **A new set of average level spacings for s-wave resonance.** Huang Zhongfu (Guangxi Univ. (China)); Zhao Zhixiang; Zhou Delin. China Nuclear Information Centre, Beijing, BJ (China); Chinese Nuclear Data Center, Beijing, BJ (China). Jun 1993. (CNDC–0012; INDC(CPR)–030/L.). In *Communication of nuclear data progress: No.9 (1993).* 113p. Order Number DE95613323. Source: OSTI; NTIS (US Sales Only); INIS.

Bayesian approach is used to evaluated s-wave average level spacings for about 210 target nuclear. The resolved resonance parameters to be analysed are taken from evaluated data of ENDF/B-6. The prior estimates for the number of s-wave resonance, N_0, are calculated by using AVRPES code. It can be seen from the calculated results that for some target nuclei there are large discrepancies among this work and others.

8853 (DOE/ER/40561–173) **Pseudo-Goldstone modes in isospin-asymmetric nuclear matter.** Cohen, T.D. (Univ. of Washington, Seattle, WA (United States)); Broniowski, W. Washington Univ., Seattle, WA (United States). [1995]. 15p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG06-90ER40561. National Science Foundation Grant INT-9313988; Maria Sklodowska Order Number DE95004763. Source: OSTI; NTIS; INIS; GPO Dep.

The authors analyze the chiral limit in dense isospin-asymmetric nuclear matter. It is shown that the pseudo-Goldstone modes in this system are qualitatively different from the case of isospin-symmetric matter.

8854 (FEI–2277) **Neutron resonance spin determination by the shape of capture gamma-quanta multiplicity spectrum.** Grigor'ev, Yu.V. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk (Russian Federation). Fiziko-Ehnergeticheskij Inst.); Georgiev, G.P.; Yaneva, N.B. Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk (Russian Federation). Fiziko-Ehnergeticheskij Inst. 1992. 8p. (In Russian). Order Number DE95613846. Source: OSTI; NTIS (US Sales Only); INIS.

Identification of 37 samarium-147 resonances by a shape of radiation capture gamma-quanta multiplicity spectra in the energy range 18.3-289.3 eV is made. The measurement results of time spectra of the first seven multiplicity factor obtained with the use of 16-section scintillation gamma-detector at the 502-m path length of the IBR-30 are used as the initial data. 5 refs.; 1 tab.

8855 (IA–1486, pp. 62) **Evidence foe phase transitional behavior of even-even nuclei from differential observables.** Wolf, A.; Casten, R.F.; Zamfir, N.V.; Brenner, D.S. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. EVEN-EVEN NUCLEI/nuclear structure; E2-TRANSITIONS; GENERATOR-COORDINATE METHOD; NUCLEAR PROPERTIES; PHASE STUDIES; PHASE TRANSFORMATIONS; RARE EARTH NUCLEI

8856 (IA–1486, pp. 62-63) **g-Factor of the 3/2⁺ 93.6 keV level of ^{91}Sr.** Wolf, A.; Gill, R.L.; Brenner, D.S.; Beranr, Z.; Schuhmann, R.B.; Zamfir, N.V. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. STRONTIUM 91/excited states; KEV RANGE 10-100; LANDE FACTOR; MAGNETIC FIELDS; NUCLEAR ALIGNMENT; NUCLEAR MAGNETIC MOMENTS; PERTURBED ANGULAR CORRELATION; SPIN; SPIN ORIENTATION

8857 (IA–1486, pp. 63) **F-SPIN PURITY OF 2^+_1 states in even-even nuclei.** Wolf, A.; Scholten, O.; Casten, R.F. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. NUCLEAR STRUCTURE/spin; ENERGY LEVELS; ENERGY-LEVEL TRANSITIONS; EVEN-EVEN NUCLEI; EXCITED STATES; LANDE FACTOR; NEUTRONS; SPIN; PROTONS; SPIN ORIENTATION; SYMMETRY

8858 (INIS-mf–14440, pp. 5) **Latest information on ^{104}Cd.** Radtikerdar, S. Iranian Physics Society, Teheran (Iran, Islamic Republic of); Isfahan Univ. (Iran, Islamic Republic of). Dept. of Physics. Aug 1994. 91p. (In English, Persian). (CONF-9408203–: Annual physics conference of Iran, Sanandaj (Iran, Islamic Republic of), 19 Aug - 1 sep 1994). In *Abstracts of annual physics conference of Iran, 1373 Kordestan University.* Order Number DE95611717. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. CADMIUM 104; CHROMIUM 50; GAMMA DETECTION; GAMMA SPECTRA; IRON 56 TARGET; MEV RANGE 100-1000; NEUTRON-DEFICIENT ISOTOPES

8859 (JINR–3-66-94, pp. 37-53) **Nucleon Correlation Effects on Y-Scaling Quantities in Nuclei.** Gaidarov, M.K. (Bylgarska Akademiya na Naukite, Sofia (Bulgaria)); Antonov, A.N.; Dimitrova, S.S.; Stoitsov, M.V. Joint Inst. for Nuclear Research, Dubna (Russian Federation); Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1994. In *JINR Rapid Communications. Collection 3.* 53p. Order Number DE95615980. Source: OSTI; NTIS (US Sales Only); INIS.

The asymptotic scaling function F(y) and the binding correction B(y) as well as the mean kinetic and removal energies are calculated in the cases of the ^{4}He, ^{12}Ca, ^{16}O and ^{40}Ca nuclei using the nucleon momentum distributions obtained within the Jastrow correlation method and the phenomenological model accounted for short-range and tensor nucleon-nucleon correlations. The scaling functions F(y) differ from those obtained in the mean-field approximation and are in qualitative agreement with the available experimental data. It is shown that the binding correction B(y) can be explicitly evaluated using a realistic nuclear spectral function. The account for the nucleon-nucleon correlations gives increased values of the mean kinetic (T) and mean removal (E) energy (in comparison with their values in the mean-field approximation) and leads to correct values of the binding energy per nucleon in the nuclei considered. (author). 32 refs.; 6 figs.; 1 tab.

8860 (JINR–6-63-93) **JINR rapid communications. Collection 6.** Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1993. 62p. (In English, Russian). Order Number DE95616386. Source: OSTI; NTIS (US Sales Only); INIS.

Six papers are presented dealing with pion momentum spectra in nuclear charge exchange reaction Mg (t,^{3}He); nuclotron beam extraction system and acceleration of deuterons of JINR; isotopic lifting of SU(2)-symmetry one-dimensional cluster model; and superneutron-deficient tin isotopes.

8861 (JINR-E–4-94-275) **Extension of the QPM to T ≠ 0 Based on the Formalism of the Thermo Field Dynamics.** Vdovin, A.I.; Kosov, D.S. Joint Inst. for Nuclear Research, Dubna

(Russian Federation). Lab. of Theoretical Physics. 1994. 16p. Order Number DE95613898. Source: OSTI; NTIS (US Sales Only); INIS.

Invited talk at the fourth KINR International School on Nuclear Physics, Kiev (UK), Aug 29 - Sep 7, 1994.

The way of extending the quasiparticle-phonon nuclear model (QPM) to finite temperature is presented. It is based on a formalism of the thermo field dynamics (TFD). After formal doubling of the single-particle degrees of freedom by introducing the so called tilde-states, the usual and thermal Bogolyubov transformations are carried out. The coefficients of the transformations are determined by minimizing the free energy potential of a hot nucleus in the thermal vacuum state taking into account only single particle and pairing terms of the QPM Hamiltonian. Then the thermal phonon operator is introduced as a linear superposition of forward - backward bi thermal quasiparticle amplitudes, and with the variational principle the thermal RPA equations are derived. The expression for the thermal QPM Hamiltonian in terms of thermal quasiparticles and thermal phonons is given which contains the interaction of these two types of excitation modes. The equation for the states taking into account the mixing of one- and two-thermal phonon components and the expression of the corresponding coupling matrix element are derived. (author). 16 refs.

8862 (JINR-E–6-94-252) **Odd Proton and Neutron Shells in Light Nuclei.** Morozov, V.A. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems. 1994. 6p. Order Number DE95613847. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Pis'ma v Zhurnal Ehksperimental'noj i Teoretich-eskoj Fiziki.

It is shown by analysis of nucleon and nucleon pair separation energies S_n, S_p, S_{2n}, S_{2p} in odd-odd light nuclei that odd shells are observed at Z, N = 7, 11, 15, 19, 23 as a result of coherently enhanced shell closure. The Z, N = 11 and 23 shells are most probably deformed. The Z, N = 7 and 15 shells are similar to shells with the same magic numbers in atoms and thus must be spherical. (author). 16 refs.; 2 figs.

8863 (JINR-E–6-94-271) **Nuclear Structure by Laser Spectroscopy.** Anastasov, A. (Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Reactions); Gangrskij, Yu.P.; Markov, B.N.; Zemlyanoj, S.G.; Marinova, K.P.; Nadzhakov, E.G.; Kul'dzhanov, B.K. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Reactions. 1994. 23p. Order Number DE95613848. Source: OSTI; NTIS (US Sales Only); INIS.

This report illustrates the contribution of laser spectroscopy to our knowledge about variations of nuclear charge radii in long isotopic and isotonic chains comprising stable and short lived isotopes. The recent results obtained experimentally in the Flerov Laboratory of Nuclear Reactions, JINR, Dubna, are presented and discussed. (author). 32 refs.; 9 figs.

8864 (JINR-R–4-94-229) **Nature of Negative Parity of Collective Modes.** Mikhajlov, I.N. (Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics); Usmanov, P.N.; Briancon, Ch. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1994. 18p. (In Russian). Order Number DE95613849. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Yadernaya Fizika.

To study properties of the states of negative parity in deformed nuclei a phenomenological mode which takes into account the Coriolis coupling of the octupole bands is proposed. The diabatic characteristics of dipole electric transitions are investigated by introducing a parametrization of the intrinsic m.e.(matrix element) of the operator which generates the dipole γ-transitions. This operator includes both the dipole electrical and dipole toroidal moments influence. The calculations for the isotopes ^{220,226}Ra have been performed. The energy spectra and E1-, E2- and E3-transition probability have been calculated. The m.e. values of the toroidal moment are obtained. The calculation for the energy weighted sum rule for E1-transitions has been done. The contribution of the toroidal moment to the sum rule has been estimated. (author). 15 refs.; 4 figs.; 7 tabs.

8865 (JINR-R–6-94-265) **The properties of Low-Lying States of ^{166} Er.** Usmanov, P.N. (Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems); Gromov, K.Ya.; Niyazov, R.A.; Sehrehehtehr, Zh.; Yuldashev, M.B.; Kholmatov, A.Kh. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems. 1994. 23p. (In Russian). Order Number DE95613850. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Turkish Journal of Physics.

Further investigations of the ^{166} Tm decay spectrum are performed. Calculations in the framework of the phenomenological models taking into account the mixing of low-lying states of rotational bands of ^{166} Er have been done. The branching ratio of E 2- and E 1-transitions of the positive and negative states, respectively having the strong deviations from the Alaga rule is shown. The probability values of dipole electric transitions from the $K^{\pi} = 0^-_1$, 1^-_1, 2^-_1 - bands levels are calculated. (author). 22 refs.; 3 figs.; 9 tabs.

8866 (Juel–2940) **Particle-phonon excitations in valence-neutron and valence-proton nuclei around ^{146}Gd.** Collatz, R.D. Forschungszentrum Juelich GmbH (Germany). Inst. fuer Kernphysik; Koeln Univ. (Germany). Jul 1994. 142p. (In German). Order Number DE95738042. Source: OSTI; NTIS (US Sales Only); INIS.

The present thesis deals with the one-valence-particle nuclei ^{147}Tb and ^{151}Er. The main purpose of the study was, to study characteristic properties of the particle-phonon excitations of these nuclei. In the one-valence-proton nucleus ^{147}Tb from the $\pi h_{11/2} x 3^-$ septet only the $15/2^+$ and $17/2^+$ Yrast states were known, which underly a strong diagonal exchange interaction. At mass separators in β decay experiments of the $1/2^+$ and the $11/2^-$ ^{147}Dy activities and in in-beam experiments layed out on excitation of states above the Yrast line with ^{6}Li beams the nucleus ^{147}Tb was spectroscoped. The combination of these three data sets made the nearly complete covering of the spin range from 1/2 to 27/2 of the low-lying states in ^{147}Tb possible. At the whole in this nucleus more than 100 hitherto unknown states could be placed and farly characterized. The unusually manifold data allowed to identify beside the complete $\pi h_{11/2} x 3^-$ septet also very much further particlexphonon states. Furthermore in the excitation range between 2.5 and 4 MeV numerous three-quasiparticle excitations were observed and in very sufficient way described by parameter-free shell-model calculations. A further important result is the manifestation of a neutron-one-particle-one-hole state with I=27/2, which lies with 3.7 MeV excitation close to the Yrast line. (orig./HSI)

8867 (UM-P–93/94) **Universality of Δ I = 1 meson mixing and charge symmetry breaking.** Coon, S.A.; Scadron, M.D. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 14p. (ADP–93/211/T129.). Order Number DE95616389. Source: OSTI; NTIS (US Sales Only); INIS.

The Coleman-Glashow scheme for Δ I= 1 charge symmetry breaking (CSB) suggests a universal scale for the nonstrange transitions $<\rho$ deg—H_{em}—$\omega>$ and $<\pi$ deg—H_{em}— η NS$>$ of size -0.005 GeV^2 in the energy region 760-780 MeV. The resulting nucleon-nucleon vector meson exchange CSB potential then predicts Δ I = 1, effects which are in approximate agreement with recent data characterizing nuclear charge asymmetry. 40 refs., 2 tabs., 3 figs.

6632 Radioactivity and Electromagnetic Transitions (Excluding Fission)

Refer also to citation(s) 8850, 8866, 8920

8868 (CNIC–00750, pp. 76-77) **Progress on frequently useful nuclear decay data library.** Huang Xiaolong (Chinese Nuclear Data Center, Beijing, BJ (China)); Zhou Chunmei. China Nuclear Information Centre, Beijing, BJ (China); Chinese Nuclear Data Center, Beijing, BJ (China). Jun 1993. (CNDC–0012; INDC(CPR)–030/L.). In *Communication of nuclear data progress: No.9 (1993).* 113p. Order Number DE95613323. Source: OSTI; NTIS (US Sales Only); INIS.

Considering chinese users' needs, it is being done to establish the Frequently useful Nuclear Decay Data Library at CNDC. The

primary idea of the library is described. It mainly contains frequently useful decay data for 330 nuclides. Three sorts of decay data have been put into this data library.

8869 (INIS-mf–15060) **Gamma spectroscopy for examination of light Ba isotopes after beta decay.** Siems, G. Koeln Univ. (Germany). Mathematisch-Naturwissenschaftliche Fakultaet. 6 May 1993. 92p. (In German). Order Number DE95738901. Source: OSTI; NTIS (US Sales Only); INIS.

The low-spin states of the nuclei ^{126}Ba, ^{128}Ba, and ^{130}Ba were observed in two β-decay experiments, both carried out with the OSIRIS cube, at the Cologne FN tandem accelerator. Both measurements are based on a cyclic measuring method. Lanthanum parent nuclei are created in an 'activation phase', and the gamma radiation of the barium daughter nuclei is measured after β-decay in a subsequent 'measuring phase', with the accelerator beam shut off. One significant result of both measurements is that the K=0 band could be identified for the first time in the nuclei studied. The spin could be determined in the ^{130}Ba nucleus by an evaluation of the $\gamma\gamma$-correlation data. As for the nuclei ^{126}Ba and ^{128}Ba, data in support of the spin hypothesis were found in the type of the occupying, or de-occupying, γ-transitions and in the predictions of the IBA-1 model. (orig./DG)

8870 (PNL-SA–21810) **Two neutrino double-beta decay of ^{100}Mo to the first excited 0$^+$ state in ^{100}Ru.** Barabash, A.S. (Inst. of Theoretical and Experimental Physics, Moscow (Russian Federation)); Avignone, F.T. III; Guerard, C.K.; Brodzinski, R.L.; Miley, H.S.; Reeves, J.H.; Umatov, V.I. Pacific Northwest Lab., Richland, WA (United States). Jun 1992. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-920682–4: International symposium on weak and electromagnetic interactions in nuclei, Dubna (Russian Federation), 16-22 Jun 1992). Order Number DE95004938. Source: OSTI; NTIS; INIS; GPO Dep.

Double-beta decay from the ground state of ^{100}Mo to the O$^+$ excited state at 1,130.29 keV in ^{100}Ru has been observed. A sample of 956q of Mo metal powder isotopically enriched to 98.468% of ^{100}Mo was counted in a Marinelli geometry with a well shielded, ultralow-background germanium detector. The cascade gamma-rays at 539.53 and 590.76 keV were observed. The resulting decay half-life is $1.1_{-0.2}{}^{+0.3} \times 10^{21}$ y at 68% CL.

6633 Nuclear Reactions and Scattering, General

8871 (CNIC–00750, pp. 13-16) **Theoretical progress at CNDC theory group.** Lu Zhongdao (Chinese Nuclear Data Center, Beijing, BJ (China)). China Nuclear Information Centre, Beijing, BJ (China); Chinese Nuclear Data Center, Beijing, BJ (China). Jun 1993. (CNDC–0012; INDC(CPR)–030/L.). In *Communication of nuclear data progress: No.9 (1993).* 113p. Order Number DE95613323. Source: OSTI; NTIS (US Sales Only); INIS.

In 1992, CNDC (Chinese Nuclear Data Center) theory group has made progress in model study, code making and data calculations for low energy nuclear reaction, intermediate and high energy nuclear reaction. It has also made progress in parameter library establishment. The brief explanations are presented.

8872 (CNIC–00750, pp. 17-20) **The forbidden angular region of secondary particle emission in the laboratory system.** Zhang Jingshang (Chinese Nuclear Data Center, Beijing, BJ (China)); Zhao Zhixiang. China Nuclear Information Centre, Beijing, BJ (China); Chinese Nuclear Data Center, Beijing, BJ (China). Jun 1993. (CNDC–0012; INDC(CPR)–030/L.). In *Communication of nuclear data progress: No.9 (1993).* 113p. Order Number DE95613323. Source: OSTI; NTIS (US Sales Only); INIS.

The calculated double differential cross sections (DDX) can be represented by Legendre coefficients (L.C.) in the center of mass system. It is more convenient to use DDX represented in laboratory system (L.S.). Using L.C. to calculated the DDX in L.S., one has to pay attention to the forbidden angular region for a certain outgoing energy because of the motion of the center of the mass. As an example, the spectrum and allowed angular region of DDX for α particle emission in reaction ^{56}Fe(n, α) at En = 14.5 MeV are shown out.

8873 (CNIC–00750, pp. 72-73) **The establishment of EXFOR nuclear data based system and experimental neutron data library.** Liang Qichang (Chinese Nuclear Data Center, Beijing, BJ (China)): Sun Zhengjun. China Nuclear Information Centre, Beijing, BJ (China); Chinese Nuclear Data Center, Beijing, BJ (China). Jun 1993. (CNDC–0012; INDC(CPR)–030/L.). In *Communication of nuclear data progress: No.9 (1993).* 113p. Order Number DE95613323. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. NEUTRON REACTIONS/computer codes; NEUTRON REACTIONS/data; CHINA; DATA BASE MANAGEMENT; IAEA; DATA

8874 (JINR-E–1-94-295) **Mechanisms of High Energy Hadron-Nucleus and Nucleus-Nucleus Collision Processes.** Strugalski, Z. (Politechnika Warszawska, Warsaw (Poland). Inst. Fizyki). Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of High Energy. 1994. 12p. Order Number DE95613945. Source: OSTI; NTIS (US Sales Only); INIS.

Mechanisms of high energy hadron-nucleus and nucleus-nucleus collision processes are depicted qualitatively, as prompted experimentally. In hadron-nucleus collisions the interaction of the incident hadron in intranuclear matter is localized in small cylindrical volume, with the radius as large as the strong interaction range is, centered on the hadron course in the nucleus. The nucleon emission is induced by the hadron in its passing through the nucleus; particles are produced via intermediate objects produced in 2 → 2 endoergic reactions of the hadron and its successors with downstream nucleons. In nucleus-nucleus collisions, the outcome of the reaction appears as the composition of statistically independent hadron-nucleus collision outcomes at various impact parameters. Observable effects supporting such mechanisms are discussed. 51 refs.

8875 (JINR-E–1-94-296) **Observations of Fast Hadron Passages through Intranuclear Matter.** Strugalska-Gola, E. (Polska Akademia Nauk, Warsaw (Poland)); Strugalski, Z. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of High Energy. 1994. 14p. Order Number DE95613946. Source: OSTI; NTIS (US Sales Only); INIS.

Additional data on high-energy hadron passages through layers of intranuclear matter are presented. Properties of the nucleon emission which the passages are accompanied by are described. The energy dependence of the hadron passage properties is discussed. The observed passages of fast hadrons through layers of intranuclear matter are nuclear analogue of the well known electromagnetic process - of the passages of electrically charged particles through layers of materials. The hadron passages are observed plentifully in hadron-nucleus collisions at a few GeV. 23 refs., 5 figs., 2 tabs.

8876 (JINR-E–4-94-308) **Quasi-Classical Description of Heavy Ion Reactions.** Luk'yanov, V.K. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1994. 11p. Order Number DE95613947. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to the 7. International Conference on Nuclear Reaction Mechanisms, Varenna, 6-11 Jun 1994.

A method for calculating the distorted waves for a realistic nuclear complex potential with the Coulomb forces included is developed using the quasi-classical and high energy approximations. The distorted waves are obtained in the analytical form and applications are made to elastic, inelastic scattering and to the one-nucleon transfer reactions. 9 refs., 2 figs.

8877 (JINR-E–4-94-314) **Nuclear Distorted Waves in High-Energy Approximation.** Luk'yanov, V.K. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics. 1994. 12p. Order Number DE95613948. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Yadernaya Fizika.

The high energy approximation is used for semiclassical scattering in the complex nuclear potential (the optical model). It is shown that the corresponding three-dimensional wave functions, distorted waves, depend on the effective potential instead of that used from the beginning, and the pre exponential factor appears, as compared with the known eikonal expression. A deflection of the trajectory of

motion is included playing an important role in heavy ion collisions. The method is developed for calculating, in analytic form, the typical matrix elements of direct collision processes. 12 refs.

8878 (UM-P–94/43) **Determination of scattering amplitudes from differential cross section data by using unitarity conditions.** Lun, D.R.; Allen, L.J.; Amos, K. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 21p. Order Number DE95616407. Source: OSTI; NTIS (US Sales Only); INIS.

A modification to the newton iteration method has been used to solve the nonlinear equation that specifies the phase of the scattering amplitude in terms of the complete (0 to 180 deg) cross section. The approach is tested by using it to specify the scattering amplitude from simulated data and comparing the result with the amplitude found by using an extract iterated fixed point method of solution. The modified Newton method was then used to analyse the cross sections from neutron-alpha particle scattering at low nuclear energies (< 24 MeV) and from 1000 eV electron-water molecule scattering. 13 refs., 5 figs.

6634 Specific Nuclear Reactions and Scattering

Refer also to citation(s) 8105, 8288, 8819, 8820, 8821, 8845, 8860, 9155, 9156

8879 (BNL–60964) **Search for strangelets and other rare objects in Au + Pt collisions at the AGS using a fixed-angle focusing spectrometer.** Rusek, A. (Univ. of New Mexico, Albuquerque, NM (United States). Dept. of Physics and Astronomy); Bassalleck, B.; Fischer, H.; Berdoz, A.; Franklin, G.B.; Buerger, T.; Burger, M.; Chrien, R.E.; Diebold, G.E. Brookhaven National Lab., Upton, NY (United States). [1995]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-940725–5: International conference on hypernuclear and strange particle physics, Vancouver (Canada), 4-8 Jul 1994). Order Number DE95003950. Source: OSTI; NTIS; INIS; GPO Dep.

During the 1993 AGS heavy ion run, experiment E886 conducted a strangelet search in Au + Pt reactions, with beam momentum of 10.8 GeV/c per nucleon. Presented here are the upper limit for strangelet production, invariant cross sections for p, t, d, ^{3}He, ^{4}He, ^{6}He, ^{8}He, ^{6}Li, ^{7}Li, ^{8}Li and ^{7}Be, along with a demonstration of their agreement with a coalescence model fit to data collected by E886 during the 1992 engineering run, and upper limits for production cross sections for other rare objects, such as (H dibaryon)-nucleus systems. All results reported are preliminary.

8880 (BNL–61074) **Negative binomial fits to multiplicity distributions from central collisions of ^{16}O + Cu at 14.6A GeV/c and intermittency.** Tannenbaum, M.J. Brookhaven National Lab., Upton, NY (United States); Argonne National Lab., IL (United States); Columbia Univ., New York, NY (United States). Dept. of Physics; Lawrence Livermore National Lab., CA (United States); Massachusetts Inst. of Tech., Cambridge, MA (United States); California Univ., Riverside, CA (United States). 14 Oct 1994. 15p. Sponsored by USDOE, Washington, DC (United States);Argonne National Lab., IL (United States);Columbia Univ., New York, NY (United States);Lawrence Livermore National Lab., CA (United States);Massachusetts Inst. of Tech., Cambridge, MA (United States);Cali DOE Contract AC02-76CH00016 ; W-31109-ENG-38 ; FG02-86ER40281 ; W-7405-ENG-48 ; AC02-76ER03069 ; FG03-86ER40271. Grant NGR-05-003-513. (CONF-9406274–4: NATO Advanced Research workshop on hot hadronic matter: theory and experiment, Divonne-les-Bains (France), 27 Jun - 1 jul 1994). Order Number DE95004835. Source: OSTI; NTIS; INIS; GPO Dep.

An 'intermittency' analysis of charged particle multiplicity data from the target multiplicy array (TMA) in central collisions of ^{16}O+Cu at 14.6 A×GeV/c has been published by the AGS-E802 collaboration. The centrality cut was made using the Zero degree Calorimeter and requiring that the forward energy be less than one projectile nucleon (i.e. T_{ZCAL} <13.6 GeV). In agreement with previous measurements, an apparent power-law growth of Normalized Factorial moments with decreasing pseudorapidity interval was observed in the range $1.0 \geq \delta\eta \geq 0.1$. In the present work, multiplicity distributions in individual pseudorapidity bins are presented for the same data. These distributions are excellently fit by Negative Binomial Distributions (NBD) in all $\delta\eta$ bins, allowing, for the first time, a systematic formulation of the subject of 'intermittency' in terms of distributions, rather than moments. In agreement with all previous measurements of NBD fits to multiplicity distributions in hadron and lepton reactions, the k parameter of the NBD fit for central ^{16}O+Cu collisions is found to exhibit an apparently linear increase with the $\delta\eta$ interval, albeit with a much steeper slope than for the other reactions, and a non-zero intercept, $k(0) \neq 0$. True intermittency, $\xi \rightarrow 0$, would occur if the intercept $k(0) \rightarrow 0$, which is not observed in any experiment. The correlation length for central ^{16}O+Cu collisions, although smaller than expected, is quite finite and can be measured - which means that a length scale exists in these collisions and therefore there is no intermittency in the multiplicity fluctuations.

8881 (CNIC–00690) **Communication of nuclear data progress: No.6 Supplement (1992).** Chinese Nuclear Data Center, Beijing, BJ (China); China Nuclear Information Centre, Beijing, BJ (China). Oct 1992. 125p. (CNDC–0010; INDC(CPR)–028/L.). Order Number DE95613991. Source: OSTI; NTIS (US Sales Only); INIS.

This is a supplement to No.6 of Communication of Nuclear Data Progress (CNDP), in which the second and final part of the papers of CENDL-2 (Chinese Evaluated Nuclear Data Library, Version 2.0) is published. It includes the evaluation reports of 17 elements and isotopes with incident neutron energy from 10^{-5} eV to 20 MeV, they are ^{16}O, ^{23}Na, ^{31}P, Ca, Zn, Mn, ^{59}Co, Cd, In, Hf, ^{232}Th, ^{235}U, ^{239}Pu, ^{240}Pu, ^{241}Am, ^{249}Bk, ^{249}Cf.

8882 (CNIC–00690, pp. 3-16) **The evaluation of oxygen complete neutron data for CENDL-2.** Liu Tingjin (Chinese Nuclear Data Center, Beijing, BJ (China)); Liu Jianfeng. Chinese Nuclear Data Center, Beijing, BJ (China); China Nuclear Information Centre, Beijing, BJ (China). Oct 1992. (CNDC–0010; INDC(CPR)–028/L.). In *Communication of nuclear data progress: No.6 Supplement (1992).* 125p. Order Number DE95613991. Source: OSTI; NTIS (US Sales Only); INIS.

Neutron nuclear data of oxygen for CENDL-2 has been evaluated in the energy region from 10^{-5} eV to 20 MeV. The experimental data, theoretical calculated data and covariance data are outlined. The comprehensive recommendation is presented. The recommended data were compared with other new evaluated data from JENDL-3, ENDF/B-6 and BROND-2.

8883 (CNIC–00690, pp. 17-23) **Evaluation of neutron nuclear data of sodium.** Wu Zhihua (Fudan Univ., Shanghai, SH (China). Dept. of Nuclear Science). Chinese Nuclear Data Center, Beijing, BJ (China); China Nuclear Information Centre, Beijing, BJ (China). Oct 1992. (CNDC–0010; INDC(CPR)–028/L.). In *Communication of nuclear data progress: No.6 Supplement (1992).* 125p. Order Number DE95613991. Source: OSTI; NTIS (US Sales Only); INIS.

Neutron nuclear data of sodium for CENDL-2 has been evaluated in the energy region from 10^{-5} eV to 20 MeV. Evaluated quantities are the total cross sections, elastic scattering cross sections, inelastic scattering cross sections capture cross sections, (n, 2n), (n,p), (n,α) cross sections and angular distributions. The comparison of CENDL-2, ENDF/B-6 and JENDL-3 are shown out in figures.

8884 (CNIC–00690, pp. 24-28) **The evaluation of ^{31}P complete data for CENDL-2.** Zhou Yongyi (Nanjing Univ., JS (China)); Shi Yi. Chinese Nuclear Data Center, Beijing, BJ (China); China Nuclear Information Centre, Beijing, BJ (China). Oct 1992. (CNDC–0010; INDC(CPR)–028/L.). In *Communication of nuclear data progress: No.6 Supplement (1992).* 125p. Order Number DE95613991. Source: OSTI; NTIS (US Sales Only); INIS.

Neutron nuclear data of ^{31}P for CENDL-2 has been evaluated in the incident neutron energy region from 10^{-5} eV to 20 MeV. All theoretical calculations were completed by using code MUP2.

8885 (CNIC–00690, pp. 28-36) **Evaluation of neutron nuclear data of natural calcium for CENDL-2.** Tang Guoyou (Beijing Univ. (China). Inst. of Heavy Ion Physics); Bao Shanglian; Shi Zhaomin; Cao Wentian. Chinese Nuclear Data Center, Beijing, BJ (China); China Nuclear Information Centre, Beijing, BJ (China).

Oct 1992. (CNDC–0010; INDC(CPR)–028/L.). In *Communication of nuclear data progress: No.6 Supplement (1992).* 125p. Order Number DE95613991. Source: OSTI; NTIS (US Sales Only); INIS.

Neutron nuclear data of natural calcium for CENDL-2 has been evaluated in the energy region from 10^{-5} eV to 20 MeV. Evaluated quantities are the total, nonelastic scattering, elastic and inelastic scattering, radiation capture, (n,p)(n,t)(n,2n),(n,α) reaction cross sections and the angular distributions of elastic and inelastic cross sections. Some of the data were calculated with the program AUJP based on optical model and the program MUP2 based on Hauser-Feshbach model and pre-equilibrium evaporation model.

8886 (CNIC–00690, pp. 36-40) **The evaluation of Mn data for 10^{-5} eV to 20 MeV neutrons.** Liu Yunchang (Qinghua Univ., Beijing, BJ (China). Dept. of Physics). Chinese Nuclear Data Center, Beijing, BJ (China); China Nuclear Information Centre, Beijing, BJ (China). Oct 1992. (CNDC–0010; INDC(CPR)–028/L.). In *Communication of nuclear data progress: No.6 Supplement (1992).* 125p. Order Number DE95613991. Source: OSTI; NTIS (US Sales Only); INIS.

Neutron nuclear data of Mn for CENDL-2 has been evaluated in the energy region from 10^{-5} eV to 20 MeV. Evaluated quantities are the thermal cross sections and Resonance parameters. Fast neutron cross sections. angular distributions of secondary neutrons and energy distribution of secondary neutrons. The data were calculated by using MUP2 code.

8887 (CNIC–00690, pp. 41-52) **The evaluation of cobalt data for 10^{-5} eV to 20 MeV neutrons.** Qi Huiquan (Qinghua Univ., Beijing, BJ (China). Dept. of Physics). Chinese Nuclear Data Center, Beijing, BJ (China); China Nuclear Information Centre, Beijing, BJ (China). Oct 1992. (CNDC–0010; INDC(CPR)–028/L.). In *Communication of nuclear data progress: No.6 Supplement (1992).* 125p. Order Number DE95613991. Source: OSTI; NTIS (US Sales Only); INIS.

Neutron nuclear data of CO for CENDL-2 has been evaluated in the energy region from 10^{-5} eV to 20 MeV. Evaluated quantities are the total cross sections, elastic scattering cross sections, inelastic scattering cross sections, capture cross sections, (n,n), (n,p),(n, α) reaction cross sections, angular distribution of secondary neutrons and energy distribution of secondary neutrons.

8888 (CNIC–00690, pp. 53-59) **The evaluation of natural cadmium neutron data.** Sun Yaode (Fudan Univ., Shanghai, SH (China). Dept. of Nuclear Science); You Jingsun; Wu Zhihua. Chinese Nuclear Data Center, Beijing, BJ (China); China Nuclear Information Centre, Beijing, BJ (China). Oct 1992. (CNDC–0010; INDC(CPR)–028/L.). In *Communication of nuclear data progress: No.6 Supplement (1992).* 125p. Order Number DE95613991. Source: OSTI; NTIS (US Sales Only); INIS.

A comprehensive evaluated neutron nuclear data set for cadmium, in the energy extending from 10^{-5} eV to 20.0 MeV, is described. The measured data the application of theoretical models, and the evaluation method are outlined. Attention is given to uncertainty specification and comparisons are made with the previous evaluation. The corresponding numerical file, in ENDF/B-5 format, has been stored in CENDL-2.

8889 (CNIC–00690, pp. 60-66) **Evaluated neutron data file for indium.** Wu Zhihua (Fudan Univ., Shanghai, SH (China). Dept. of Nuclear Science); Sun Yaode. Chinese Nuclear Data Center, Beijing, BJ (China); China Nuclear Information Centre, Beijing, BJ (China). Oct 1992. (CNDC–0010; INDC(CPR)–028/L.). In *Communication of nuclear data progress: No.6 Supplement (1992).* 125p. Order Number DE95613991. Source: OSTI; NTIS (US Sales Only); INIS.

Neutron nuclear data of In for CENDL-2 has been evaluated in the energy region from 10^{-5} eV to 20 MeV. Evaluated quantities are the resonance parameters, total cross sections, elastic scattering cross sections, inelastic scattering cross sections, capture cross sections, (n,2n), (3,3n) cross sections and angular distributions. The data were calculated by using MUP2 code.

8890 (CNIC–00690, pp. 66-71) **Evaluation of hafnium neutron cross sections.** Wu Zhihua (Fudan Univ., Shanghai, SH (China). Dept. of Nuclear Science). Chinese Nuclear Data Center, Beijing, BJ (China); China Nuclear Information Centre, Beijing, BJ (China). Oct 1992. (CNDC–0010; INDC(CPR)–028/L.). In *Communication of nuclear data progress: No.6 Supplement (1992).* 125p. Order Number DE95613991. Source: OSTI; NTIS (US Sales Only); INIS.

Neutron nuclear data of natural hafnium and hafnium isotopes for CENDL-2 has been evaluated in the energy region from 10^{-5} eV to 20 MeV. Evaluated quantities are the total, elastic and inelastic scattering radiation capture, (n, zn), (n,p), (n, α) reaction cross sections and the angular distribution of secondary neutrons. All cross sections were calculated by using optical model, H-F theory and pre-equilibrium model.

8891 (CNIC–00690, pp. 72-84) **Evaluation of neutron nuclear data of ^{239}Pu for CENDL-2.** Liang qichang (Chinese Nuclear Data Center, Beijing, BJ (China)); Yan Shiwei; Shen Qingbiao; Cai Dunjiu; Cai Chonghai; Tong Guoyou; Zhou Zhining. Chinese Nuclear Data Center, Beijing, BJ (China); China Nuclear Information Centre, Beijing, BJ (China). Oct 1992. (CNDC–0010; INDC(CPR)–028/L.). In *Communication of nuclear data progress: No.6 Supplement (1992).* 125p. Order Number DE95613991. Source: OSTI; NTIS (US Sales Only); INIS.

Based on the experimental data evaluation and theoretical calculation, the complete neutron nuclear data of ^{239}Pu have been evaluated in the incident neutron energy range from 10^{-5} eV to 20 MeV for CENDL-2. The comparison of present evaluation with ENDF/B-6, JENDL-3 and BROND-2 has been carried out.

8892 (CNIC–00690, pp. 84-97) **Evaluation of neutron nuclear data for ^{240}Pu.** Cai Dunjiu (Chinese Nuclear Data Center, Beijing, BJ (China)); Yu Baosheng; Wang Zisheng; Yan Shiwei; Shen Qingbiao; Cai Chonghai. Chinese Nuclear Data Center, Beijing, BJ (China); China Nuclear Information Centre, Beijing, BJ (China). Oct 1992. (CNDC–0010; INDC(CPR)–028/L.). In *Communication of nuclear data progress: No.6 Supplement (1992).* 125p. Order Number DE95613991. Source: OSTI; NTIS (US Sales Only); INIS.

Based on the experimental data evaluation and theoretical calculation, a complete set of neutron nuclear data for ^{240}Pu has been recommended in the incident neutron energy range from 10^{-5} eV to 20 MeV for CENDL-2. The comparison of present evaluation with ENDF/B-6 and JENDL-3 has been carried out.

8893 (CNIC–00690, pp. 97-113) **Evaluation of neutron nuclear data for ^{241}Am.** Zhou Delin (Chinese Nuclear Data Center, Beijing, BJ (China)); Gu Fuhua; Yu Baosheng; Zhuang Youxiang; Liu Tong; Shi Xiangjun; Yan Shiwei; Wang Cuilan; Zhang Jingshang. Chinese Nuclear Data Center, Beijing, BJ (China); China Nuclear Information Centre, Beijing, BJ (China). Oct 1992. (CNDC–0010; INDC(CPR)–028/L.). In *Communication of nuclear data progress: No.6 Supplement (1992).* 125p. Order Number DE95613991. Source: OSTI; NTIS (US Sales Only); INIS.

A complete set of neutron nuclear data for ^{241}Am has been evaluated from 10^{-5} eV to 20 MeV. The numerical data are available in ENDF/B-6 format.

8894 (CNIC–00690, pp. 114-117) **Evaluation of neutron nuclear data for ^{249}Bk.** Zhou Delin (Chinese Nuclear Data Center, Beijing, BJ (China)); Zhang Jin; Yu Baosheng; Yuan Hanrong; Liu Tong; Su Zongdi; Yan Shiwei; Wang Cuilan; Zhang Jingshang. Chinese Nuclear Data Center, Beijing, BJ (China); China Nuclear Information Centre, Beijing, BJ (China). Oct 1992. (CNDC–0010; INDC(CPR)–028/L.). In *Communication of nuclear data progress: No.6 Supplement (1992).* 125p. Order Number DE95613991. Source: OSTI; NTIS (US Sales Only); INIS.

A complete set of neutron nuclear data for ^{249}Bk in ENDF/B-6 format were evaluated in the energy range from 10^{-5} eV to 20 MeV based on the measured data, systematics predications and model theory calculations. The numerical data are available in ENDF/B-6 format.

8895 (CNIC–00690, pp. 118-123) **Evaluation of neutron nuclear data for ^{249}Cf.** Zhou Delin (Chinese Nuclear Data Center, Beijing, BJ (China)); Yu Baosheng; Yuan Hanrong; Liu Tong; Zhang Jin; Su Zongdi; Yan Shiwei; Wang Cuilan; Zhang Jingshang. Chinese Nuclear Data Center, Beijing, BJ (China); China Nuclear

Information Centre, Beijing, BJ (China). Oct 1992. (CNDC–0010; INDC(CPR)–028/L.). In *Communication of nuclear data progress: No.6 Supplement (1992).* 125p. Order Number DE95613991. Source: OSTI; NTIS (US Sales Only); INIS.

A complete set of neutron nuclear data from 10^{-5} eV to 20 MeV in ENDF/B-6 format has been evaluated for ^{249}Cf based on measured data, systematics predications and model theory calculations. The evaluated quantities are the total, elastic and inelastic scattering, fission, capture, (n,2n), (n,3n) reaction cross sections, the resolved and unresolved resonance parameters, the angular and energy distributions of emitted neutrons and the average number of neutrons emitted per fission. The numerical data are available in ENDF/B-6 format.

8896 (CNIC–00690, pp. 123-125) **The summary for recommended data of natural Zn, ^{232}Th and ^{235}U for CENDL-2.** Liang Qichang (Chinese Nuclear Data Center, Beijing, BJ (China)). Chinese Nuclear Data Center, Beijing, BJ (China); China Nuclear Information Centre, Beijing, BJ (China). Oct 1992. (CNDC–0010; INDC(CPR)–028/L.). In *Communication of nuclear data progress: No.6 Supplement (1992).* 125p. Order Number DE95613991. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. THORIUM 232/evaluated data; URANIUM 235/evaluated data; ZINC/evaluated data; DATA ACQUISITION; NEUTRON REACTIONS; ZINC

8897 (CNIC–00750) **Communication of nuclear data progress: No.9 (1993).** China Nuclear Information Centre, Beijing, BJ (China); Chinese Nuclear Data Center, Beijing, BJ (China). Jun 1993. 113p. (CNDC–0012; INDC(CPR)–030/L.). Order Number DE95613323. Source: OSTI; NTIS (US Sales Only); INIS.

The is the ninth issue of <<Communication of Nuclear Data Progress>> (CNDP), in which the nuclear data progress in China during the passed year is carried. It includes optical model parameters for both small angles and larger angles elastic scattering, n-T phase shift analyses, forbidden angular region of secondary particle emission, introduction to codes CMUP2 and CFUP1, diffusion process of nuclear fission, techniques used for charged particle evaluation at CNDC, evaluation of neutron nuclear data for ^{7}Li and revision on recommended data of ^{238}U for CENDL-2, Chinese Evaluated Nuclear Parameter Library (CENPL) (II) and computer program library at CNDC, covariance data evaluation for experimental data and several examples of least squares combination for derived data, and calculation of thermal neutron scattering law for anisotropic microcrystals etc.

8898 (CNIC–00750, pp. 1-7) **Optical model parameters and fast neutron small angles scattering cross sections.** Qi Huiquan (Department of Modern Applied Physics, Qinghua Univ., Beijing (China)); Chen Zhenpeng; Chen Qiankun. China Nuclear Information Centre, Beijing, BJ (China); Chinese Nuclear Data Center, Beijing, BJ (China). Jun 1993. (CNDC–0012; INDC(CPR)–030/L.). In *Communication of nuclear data progress: No.9 (1993).* 113p. Order Number DE95613323. Source: OSTI; NTIS (US Sales Only); INIS.

The differential cross sections of 14.8 MeV (or 14.7 MeV) neutrons scattered from ^{238}U, Pb, Ni, Fe, Cr and Al between 2.5 degree to 16 degree measured by Tsinghua University and those cross sections in the larger angle region measured by others are analysed with spherical optical model or coupled channels model (code ECIS79). A set of global optical model parameters were obtained at 14.8 MeV neutron energy for mass number between 27 and 238. The measured and calculated results are compared and discussed.

8899 (CNIC–00750, pp. 8-13) **A theoretical calculation of n-T scattering cross sections.** Wang Yansen (Fudan Univ., Shanghai, SH (China). Dept. of Nuclear Science); Chen Jianxin; Yuan Zhushu; Chen Chiqing; Qiu Zhihong; Wang Haiming; Zhuang Youxiang. China Nuclear Information Centre, Beijing, BJ (China); Chinese Nuclear Data Center, Beijing, BJ (China). Jun 1993. (CNDC–0012; INDC(CPR)–030/L.). In *Communication of nuclear data progress: No.9 (1993).* 113p. Order Number DE95613323. Source: OSTI; NTIS (US Sales Only); INIS.

By using the phase shift analysis method, the $\sigma_{tt'}$, $\sigma_{nn'}$, σ_{non} and $\sigma(\theta)$ of n-T scattering were calculated. The calculated results are in good agreement with the new experimental data and better than the previous calculations.

8900 (CNIC–00750, pp. 25-27) **Diffusion process of nuclear fission.** Lu Zhongdao (Chinese Nuclear Data Center, Beijing, BJ (China)). China Nuclear Information Centre, Beijing, BJ (China); Chinese Nuclear Data Center, Beijing, BJ (China). Jun 1993. (CNDC–0012; INDC(CPR)–030/L.). In *Communication of nuclear data progress: No.9 (1993).* 113p. Order Number DE95613323. Source: OSTI; NTIS (US Sales Only); INIS.

A fission diffusion model was proposed to explain the experimental data for high energy ion collisions. This model takes the fission process as a diffusion process, which can be described by Smoluchowski equation. It has been applied to explain the enhancement of neutron emission in heavy ion collisions forming the composite nucleus ^{158}Er. The experimental data are well reproduced by the model calculations.

8901 (CNIC–00750, pp. 28-32) **Review and evaluation of fission barrier properties research.** Wang Shunuan (Chinese Nuclear Data Center, Beijing, BJ (China)). China Nuclear Information Centre, Beijing, BJ (China); Chinese Nuclear Data Center, Beijing, BJ (China). Jun 1993. (CNDC–0012; INDC(CPR)–030/L.). In *Communication of nuclear data progress: No.9 (1993).* 113p. Order Number DE95613323. Source: OSTI; NTIS (US Sales Only); INIS.

The situation of researching nuclear fission barrier properties is introduced and reviewed briefly, especially reviewed and evaluated on the nuclear fission barrier parameters for nuclear parameters library constructed.

8902 (CNIC–00750, pp. 33-42) **Techniques used for charged particle nuclear data evaluation at CNDC.** Zhuang Youxiang (Chinese Nuclear Data Center, Beijing, BJ (China)); Sun Zuxun. China Nuclear Information Centre, Beijing, BJ (China); Chinese Nuclear Data Center, Beijing, BJ (China). Jun 1993. (CNDC–0012; INDC(CPR)–030/L.). In *Communication of nuclear data progress: No.9 (1993).* 113p. Order Number DE95613323. Source: OSTI; NTIS (US Sales Only); INIS.

The methods and techniques used for Charged Particle Nuclear Data (CPND) evaluation at Chinese Nuclear Data Center (CNDC) are summarized, including compilation and evaluation of experimental data, nuclear reaction theory and model calculation, systematics research and comprehensive recommendation etc.

8903 (CNIC–00750, pp. 43-52) **Evaluation of neutron nuclear data for ^{7}Li.** Yu Baosheng (Chinese Nuclear Data Center, Beijing, BJ (China)); Cai Dunjiu. China Nuclear Information Centre, Beijing, BJ (China); Chinese Nuclear Data Center, Beijing, BJ (China). Jun 1993. (CNDC–0012; INDC(CPR)–030/L.). In *Communication of nuclear data progress: No.9 (1993).* 113p. Order Number DE95613323. Source: OSTI; NTIS (US Sales Only); INIS.

New complete neutron data for ^{7}Li have been evaluated for CENDL-2. It updates our work in 1978 for CENDL-1 to extend incident neutron energy range from 10^{-5} eV to 20 MeV. Combining new experimental data and benchmark testing, the tritium production cross section were improved. The comparison of present evaluation with ENDF/B-6 and JENDL-3 has been made.

8904 (CNIC–00750, pp. 53-55) **Revision on recommended data of ^{238}U for CENDL-2.** Tang Guoyou (IHIP, Beijing Univ. (China)); Cai Dunjiu. China Nuclear Information Centre, Beijing, BJ (China); Chinese Nuclear Data Center, Beijing, BJ (China). Jun 1993. (CNDC–0012; INDC(CPR)–030/L.). In *Communication of nuclear data progress: No.9 (1993).* 113p. Order Number DE95613323. Source: OSTI; NTIS (US Sales Only); INIS.

In the new version for recommended data of ^{238}U, the resonance parameters in the energy range below 50 KeV are taken from JENDL-3. The recommended data of capture cross section in neutron energy range from 50 to 500 KeV was based on measured data of K.Kobayashi et al.. The new version data of ^{238}U have been collected in the CENDL-2.

8905 (CNIC–00750, pp. 55-57) **Progress on the evaluation of charged particle nuclear reaction data in Sichuan University.** Peng Xiufeng (Sichuan Univ., Chengdu, SC (China). Inst. of Nuclear Science and Technology); Liu Mantian; He Fuqing; Long Xianguan. China Nuclear Information Centre, Beijing, BJ (China);

Chinese Nuclear Data Center, Beijing, BJ (China). Jun 1993. (CNDC–0012; INDC(CPR)–030/L.). In *Communication of nuclear data progress: No.9 (1993).* 113p. Order Number DE95613323. Source: OSTI; NTIS (US Sales Only); INIS.

The evaluations of excitation function of 9 reactions induced by charged particles (p, α, d) have been fulfilled. The evaluated nuclear reactions and the experimental works are presented. The recommended data for each reaction were remarked.

8906 (DOE/ER/40246–9) **Neutron scattering studies in the actinide region. Progress report, August 1, 1991–July 31, 1994.** Kegel, G.H.R.; Egan, J.J. Massachusetts Univ., Lowell, MA (United States). Sep 1994. 48p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-86ER40246. Order Number DE95004621. Source: OSTI; NTIS; INIS; GPO Dep.

During the period August 1, 1991 to July 31, 1994 the authors report progress on the following: (a) prompt fission neutron energy spectra for ^{235}U and ^{239}Pu; (b) two-parameter measurement of nuclear lifetimes; (c) 'black' neutron detector; (d) data reduction techniques for neutron scattering experiments; (e) elastic and inelastic neutron scattering studies in ^{197}Au; (f) elastic and inelastic neutron scattering studies in ^{239}Pu; (g) neutron induced defects in silicon dioxide MOS structures; (h) response of a ^{235}U fission chamber near reaction thresholds; (i) efficiency calibration of a liquid scintillation detector using the WNR facility at LAMPF; (j) prompt fission neutron energy spectrum measurements below the incident neutron energy; (k) multi-parameter data acquisition system; (l) accelerator improvements; (m) non-DOE supported research. Eight Ph.D. dissertations and two M.S. theses were completed during the report period. Publications consisted of 6 journal articles, 10 conference proceedings, and 19 abstracts of presentations at scientific meetings. One invited talk was given.

8907 (DOE/ER/40354–5) **Studies of the spin-isospin response of the nuclear continuum using intermediate energy hadrons. Final technical report, May 20, 1987–April 30, 1994.** Georgia Univ., Athens, GA (United States). Research Foundation. [1995]. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG09-87ER40354. Order Number DE95004437. Source: OSTI; NTIS; INIS; GPO Dep.

For the most part the work supported by this grant has involved study of the spin, isospin, and multipole content of the continuum of nuclei. Most of the work has used polarized (p,p′) or (d,d′) reactions, measuring spin observables to infer properties of the target nuclei. In addition some work has been done using the (p,nx) reaction to study the Δ excitation region of the continuum. Publications resulting from this work have included seventeen refereed articles and letters, seventeen abstracts and conference talks, three of which were invited. Experiments included: ^{12}C(p,p), E=318 MeV; ^{48}Ca(p,p), E=318 MeV; ^{40}Ca(p,p), E=800 MeV; ^{208}Pb(p,p), E=200 MeV; H,^{12}C(n,p); ^{40}Ca(p,p), E=580 MeV; ^{208}Pb(p,p), E=200 MeV; ^{12}C(d,d), E_d=400 MeV; ^{40}Ca(p,p), E=500 MeV; ^{12}C(p,p), E=800 MeV; ^{40}Ca(d,d), E_d=400 MeV; ^{40}Ca(p,p), E_p=318 MeV; ^{208}Pb(p,p), E_p=200 MeV; ^{12}C(d,d), E_d=400 MeV; ^{2}H,^{12}C(p,nπ), E_p=800 MeV; ^{12}C(d,d), E_d=600 MeV.

8908 (DOE/ER/40561–174) **Shock compression and expansion in central collisions.** Danielewicz, P. (Univ. of Washington, Seattle, WA (United States). Institute for Nuclear Theory). Washington Univ., Seattle, WA (United States). Inst. for Nuclear Theory. [1995]. 16p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG06-90ER40561. National Science Foundation PHY-9403666. Order Number DE95004764. Source: OSTI; NTIS; INIS; GPO Dep.

Physics of central symmetric reactions of heavy nuclei, in the beam energy range from few tens of MeV to a couple of GeV per nucleon, is discussed. Within transport simulations, it is shown that shock fronts perpendicular to the beam axis form in the head-on reactions. The fronts propagate into projectile and target and they separate hot compressed matter from normal matter. With an increase of the impact parameter, the angle of inclination of fronts relative to the beam axis decreases, and in-between the fronts a weak tangential discontinuity develops. Hot matter exposed to the vacuum in directions perpendicular to the shock motion (and parallel to fronts), starts to expand sideways, early within reactions. Expansion in the direction of shock motion follows, after the shocks traverse nuclei, but due to the delay does not acquire same strength. Expansion affects angular distributions and mean-energy components, and further shapes of spectra and mean energies of different particles emitted into any one direction, and also particle yields. Both the anisotropy in the expansion and a collective motion associated with the weak discontinuity, affect the magnitude of sideward flow within reaction plane. Differences in mean particle energy components in and out of the reaction plane in semicentral collisions, depend sensitively on the relative magnitude of shock speed in normal matter and speed of sound in hot matter. The missing energy, considered in the past in association with low measured pion-multiplicity in central reactions, may be identified with the energy of collective expansion.

8909 (IA–1486, pp. 59-60) **New analysis of elastic photon scattering from ^{209}Bi.** Kahane, S. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. GAMMA RADIATION/elastic scattering; BISMUTH 209 TARGET; MEV RANGE 10-100

8910 (IA–1486, pp. 60-61) **Elastic scattering cross-sections of 11.4 MeV photons from ^{206,207,208}Pb, ^{209}Bi and ^{181}Ta.** Kahane, S.; Moreh, R. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. ELASTIC SCATTERING/cross sections; GAMMA RADIATION/elastic scattering; BISMUTH 209 TARGET; LEAD 206 TARGET; LEAD 207 TARGET; LEAD 208 TARGET; MEV RANGE 10-100; NUMERICAL DATA; RAMAN EFFECT; TANTALUM 181 TARGET

8911 (IC–94/313) **The structure of a source from interferometry measurements in heavy ion collisions.** Filip, P. International Centre for Theoretical Physics, Trieste (Italy). Oct 1994. 12p. Order Number DE95614044. Source: OSTI; NTIS (US Sales Only); INIS.

Some experimental results of correlation functions in Bose-Einstein (B-E) interferometry measurements exhibit a non smooth behaviour - oscillations. Possible origin of such a behaviour in non-trivial spatial distribution of the source is considered here. A method for obtaining additional information about the structure of source emitting identical particles is suggested. It is shown that this information could be extracted by a one dimensional fourier analysis of the filtered correlation function. Further possible enhancement of the method is sketched. Some technical aspects of the proposed technique are discussed. (author). 13 refs, 4 figs.

8912 (INIS-mf–13801, pp. RC3) **Photonuclear reactions of complex nuclei at intermediate energies.** Sakamoto, K. (Kanazawa Univ. (Japan). Faculty of Science). Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico); Instituto de Investigaciones Electricas, Cuernavaca (Mexico); Universidad Autonoma del Estado de Morelos (UAEM), Cuernavaca (Mexico). 1992. 30p. (CONF-9208272–: 9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry, Cuernavaca (Mexico), 16-21 Aug 1992). In *9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry. Abstracts.* Order Number DE95611878. Source: OSTI; NTIS (US Sales Only); INIS.

We have currently been performing radiochemical cross section measurements of photonuclear reactions of more than 25 targets from ^{7} Li to ^{209} Bi at bremsstrahlung end-point energies E_0 = 30-1000 MeV in steps of 50 MeV or less. In these energy ranges photons are absorbed by target nuclei through different types of resonance depending on photon energy, and photospallation process dominates in competing exit channels including fission, fragmentation and /or simple (γ , $\pi^{\pm}$ xn) reactions. (Author).

8913 (INIS-mf–14440, pp. 4) **A review of electron scattering at intermediate energies.** Kalantar-nayestanaki, N. Iranian Physics Society, Teheran (Iran, Islamic Republic of); Rijksuniversiteit Groningen (Netherlands). Aug 1994. 91p. (In English, Persian). (CONF-9408203–: Annual physics conference of Iran,

Sanandaj (Iran, Islamic Republic of), 19 Aug - 1 sep 1994). In *Abstracts of annual physics conference of Iran, 1373 Kordestan University*. Order Number DE95611717. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. ELECTRON BEAMS/scattering; ELECTROMAGNETIC INTERACTIONS; SCATTERING; REVIEWS

8914 (JINR–3-66-94, pp. 11-18) **Identification of the Doubly Magic Nucleus ^{100}Sn in the Reaction ^{112}Sn (63 MeV/Nucleon) + ^{nat}Ni.** Lewitowicz, M. (Grand Accelerateur National d'Ions Lourds (GANIL), 14 - Caen (France)); Anne, R.; Auger, G. Joint Inst. for Nuclear Research, Dubna (Russian Federation); Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Reactions. 1994. In *JINR Rapid Communications. Collection 3*. 53p. Order Number DE95615980. Source: OSTI; NTIS (US Sales Only); INIS.

We report on the production of doubly magic nucleus ^{100}Sn and other proton-rich nuclei in the A = 100 region in the reaction ^{112}Sn + ^{nat}Ni at 63 MeV/nucleon. The experiment was carried out using the high acceptance device SISSI and the Alpha and LISE3 spectrometers at GANIL. The identification of the reaction products (A, Z and Q) was done using the measurements of time-of-flight, energy-loss and kinetic energy. (author).16 refs.; 2 figs.

8915 (JINR–3-66-94, pp. 30-36) **The Inclusive Energy Spectra of Light Charged Particles (p, d, t, ^{4}He) from Spontaneous Fission of ^{248}Cm.** Kuznetsov, I.V.; Ivanov, M.P.; Kushniruk, V.F.; Sobolev, Yu.G.; Buklanov, G.V. Joint Inst. for Nuclear Research, Dubna (Russian Federation); Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Reactions. 1994. (In Russian). In *JINR Rapid Communications. Collection 3*. 53p. Order Number DE95615980. Source: OSTI; NTIS (US Sales Only); INIS.

A semiconductor dE-E telescope was used to measure the inclusive energy spectra of light p, d, t, ^{4}He particles from spontaneous fission of ^{248}Cm. The most probable energies and the widths of the energy distributions of particles within the limits of experimental errors are consistent with available data for a wide range of nuclei undergoing low fission processes. The measured relative probability of the long range α-particle emission is consistent with the observed dependence of the ternary spontaneous fission probability on the parameter Z^2/A of the fissioning nucleus for the nuclides with $Z \geq 96$. The proton energy spectra have a low-energy component with $E_p \leq 4$ MeV which cannot be explained as a contribution of the background (n, p) and (α, p) reactions. (author). 10 refs.; 3 figs.; 1 tab.

8916 (JINR–4-61-93) **JINR rapid communications. Collection 4.** Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1993. 75p. (In English, Russian). Order Number DE95616411. Source: OSTI; NTIS (US Sales Only); INIS.

Papers are presented dealing with experiments on nuclear reaction studies at the JINR Nuclotron.

8917 (JINR-D–15-93-80, pp. 53-62) **On a possibility of application of the MT-25 microtron in the Plovdiv University.** Kondev, F.G. (Joint Inst. for Nuclear Research, Dubna (Russian Federation)); Tonchev, A.P.; Balabanov, N.P.; Khristov, Kh.G. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1993. 119p. (In Russian). (CONF-9209490–: Workshop on application of microtrons in nuclear physics, Plovdiv (Bulgaria), 22-24 Sep 1992). In *Microtron MT-25. Workshop on application of microtrons in nuclear physics*. Order Number DE95611718. Source: OSTI; NTIS (US Sales Only); INIS.

The paper deals with a possibility to use MT-25 microtron which is being set up in Plovdiv, Bulgaria, for studying a wide spectrum of nuclear physics problems. Possibilities to study the structure of nuclei and mechanisms of photonuclear reactions, to generate and analyse experimental information about excitation of isomeric states of nuclei in photonuclear reactions on the nuclei in a wide range of mass numbers, to ensure systematic yields of rare-earth elements in photofission process are discussed, using investigations carried out in Dubna, Russia, at a similar accelerator as an example. A possibility to apply the microtron for gamma-activation analysis is also noted. 12 refs., 4 figs., 4 tabs.

8918 (JINR-D–15-93-80, pp. 63-74) **Photofission of nuclei at low excitation energies.** Gangrskij, Yu.P. (Joint Inst. for Nuclear Research, Dubna (Russian Federation)). Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1993. 119p. (In Russian). (CONF-9209490–: Workshop on application of microtrons in nuclear physics, Plovdiv (Bulgaria), 22-24 Sep 1992). In *Microtron MT-25. Workshop on application of microtrons in nuclear physics*. Order Number DE95611718. Source: OSTI; NTIS (US Sales Only); INIS.

The paper presents a review of the experimental data of heavy nuclei fission ($Z \geq 88$) by low-energy γ-quanta. The primary objective of the paper is such area of investigations as fission cross sections, angular distribution of fragments, spontaneously fissile isomers for a wide range of nuclei mass numbers, up to transuranium elements. Peculiarities of nuclei photofission are discussed for such processes as nuclei fission in the region of giant resonance, subbarrier nuclei photofission of isomeric nuclei using microtrons. 34 refs., 12 figs., 1 tab.

8919 (JINR-D–15-93-80, pp. 75-81) **Cross section of the californium 249 photofission.** Tarantin, N.I. (Joint Inst. for Nuclear Research, Dubna (Russian Federation)); Kim Su Men. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1993. 119p. (In Russian). (CONF-9209490–: Workshop on application of microtrons in nuclear physics, Plovdiv (Bulgaria), 22-24 Sep 1992). In *Microtron MT-25. Workshop on application of microtrons in nuclear physics*. Order Number DE95611718. Source: OSTI; NTIS (US Sales Only); INIS.

Measurements of ^{249}Cf nuclei photofission cross sections are carried out, in particular, the measurements of ^{232}Th and ^{238}U nuclei photofission yields are repeated. Bremsstrahlung of MT-22 microtron is used for nuclei fission. The experimental techniques are described. Experimental values of ^{232}Th, ^{238}U and ^{249}Cf photofission yields are presented depending on the energy of electrons which bombard the bremsstrahlung target. Calculated cross sections are compared with the experimental values of the photofission yield of the nuclei under consideration; their approximation functions are derived. The reduced cross sections of the photofission of these nuclei depending on the energy of bremsstrahlung photons are presented. The cross section of ^{249}Cf photofission which has been measured for the first time, equals 310 mb. 8 refs., 3 figs., 1 tab.

8920 (JINR-D–15-93-80, pp. 82-92) **Study on the (γ, γ') reactions with population of high spin ^{180m}Hf, ^{190m}Os and ^{204m}Pb isomers.** Kondev, F.G. (Joint Inst. for Nuclear Research, Dubna (Russian Federation)); Tonchev, A.P.; Gangrskij, Yu.P.; Belov, A.G. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1993. 119p. (In Russian). (CONF-9209490–: Workshop on application of microtrons in nuclear physics, Plovdiv (Bulgaria), 22-24 Sep 1992). In *Microtron MT-25. Workshop on application of microtrons in nuclear physics*. Order Number DE95611718. Source: OSTI; NTIS (US Sales Only); INIS.

The present paper deals with investigations into (γ, γ') reactions resulting in the formation of high-spin isomers of ^{180m}Hf, ^{190m}Os and ^{204m}Pb which are attributed to the region of deformed and spheric nuclei. Experimental values of isomeric rations are compared, applying a statistic model for the calculations, parameters which describe γ-cascade are determined. 32 refs., 5 figs., 2 tabs.

8921 (JINR-D–15-93-80, pp. 93-98) **The (γ, γ')-experiment at the injection for the Moscow racetrack microtron.** Alimov, A.S. (Moskovskij Gosudarstvennyj Univ., Moscow (Russian Federation). Nauchno-issledovatel'skij Inst. Yadernoj Fiziki); Chepurnov, A.S.; Chubarov, O.V.; Gribov, I.V.; Ishkhakov, B.S.; Kapitonov, I.M.; Piskarev, I.M.; Shirokov, E.V.; Shumakov, A.V.; Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1993. 119p. (CONF-9209490–: Workshop on application of microtrons in nuclear physics, Plovdiv (Bulgaria), 22-24 Sep 1992). In *Microtron MT-25. Workshop on application of microtrons in nuclear physics*. Order Number DE95611718. Source: OSTI; NTIS (US Sales Only); INIS.

Investigations into nuclei structures, their energy levels and transients are carried out using the racetrack injector of the Moscow University. The application of (γ, γ') reactions in the experiment

enables generation of information about the population of excited states of the nuclei under considerations, as well as about γ-decay of final nuclei. The results obtained for the excited states of atomic nuclei of ^{11}B, ^{19}F, ^{23}Na, ^{28}Si, ^{32}S, ^{39}K, ^{63}Cu, ^{208}Pb and their transients are presented. 3 refs., 3 figs., 2 tabs.

8922 (JINR-D–15-93-80, pp. 99-105) **Study on the photonuclear reactions with alpha particles and cluster emission in the region of giant dipole resonance.** Gangrskij, Yu.P. (Joint Inst. for Nuclear Research, Dubna (Russian Federation)); Kondev, F.G.; Tonchev, A.P.; Balabanov, N.P.; Khristov, Kh.G. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1993. 119p. (In Russian). (CONF-9209490–: Workshop on application of microtrons in nuclear physics, Plovdiv (Bulgaria), 22-24 Sep 1992). In *Microtron MT-25. Workshop on application of microtrons in nuclear physics.* Order Number DE95611718. Source: OSTI; NTIS (US Sales Only); INIS.

The paper is aimed at measuring the cross sections and functions of excitation reactions (γ, α) for nuclei in a wide range of Z and A for γ-quanta energies in the region of giant dipole resonance (18-25 MeV) as well as at comparing them with similar reactions and theoretical calculations. 12 refs., 2 figs., 1 tab.

8923 (JINR-D–15-93-80, pp. 106-108) **Photoactivation of isomer ^{137}Ce in the region of giant dipole resonance.** Belov, A.G. (Joint Inst. for Nuclear Research, Dubna (Russian Federation)); Gangrsky, Yu.P.; Kondev, F.G.; Tonchev, A.P.; Balabanov, N.P. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1993. 119p. (CONF-9209490–: Workshop on application of microtrons in nuclear physics, Plovdiv (Bulgaria), 22-24 Sep 1992). In *Microtron MT-25. Workshop on application of microtrons in nuclear physics.* Order Number DE95611718. Source: OSTI; NTIS (US Sales Only); INIS.

In the present paper the isomeric ratio of ^{137}Ce versus γ-quanta energy in the area of the giant dipole resonance has been studied. The investigation of isomer yields for $\Delta \geq 4$ is of particular interest because such a difference in angular momenta may lead to a considerable influence of the quadrupole component in the population of these states. 4 refs., 1 fig., 1 tab.

8924 (JINR-E–1-94-201) **Cascades of Nuclear Interactions in Liquid Hydrogen.** Gaitinov, A.Sh. (AN Kazakhskoj SSR, Alma-Ata (Kazakhstan). Inst. Fiziki Vysokikh Ehnergij); Kolen'ko, A.P.; Glagolev, V.V.; Trutko, M.A.; Siemiarczuk, T.; Wislicki, W. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of High Energy. 1994. 15p. Order Number DE95613992. Source: OSTI; NTIS (US Sales Only); INIS.

Chains of up to five successive interactions of nuclei from Helium to Oxygen with protons have been observed and studied in the Hydrogen bubble chamber exposed to the Oxygen beam with 50 GeV/c momentum. Frequencies of final state topologies and charge configurations are reported. Copious emission of Z = 2 fragments is observed, which we conjecture with a production of the short-lived ^{8} Be isotope. (author). 3 refs.; 5 figs.; 4 tabs.

8925 (JINR-E–1-94-228) **The Possibility to Investigate J/Ψ production and Gluon Distributions Using Muon Beam of U-600.** Aliev, R.M.; Krivokhizhin, V.G.; Usubov, Z.U. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1994. 8p. Order Number DE95613981. Source: OSTI; NTIS (US Sales Only); INIS.

The paper presents the differential cross section and asymmetry predictions for reaction μ N -> $\mu J/\Psi$ X in the gluon-photon fusion model at the U-600 energies. (author). 17 refs.; 6 figs.; 1 tab.

8926 (JINR-E–1-94-241) **Experimental Results on Charge Exchange Reactions with Δ Excitations and Polarization Studies of Δ and N* (1440) Resonances.** Strokovsky, E.A.; Gareev, F.A. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of High Energy. 1994. 15p. Order Number DE95614022. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Yadernaya Fizika.

Main results of inclusive and exclusive experimental studies of (^{3}He, t), (t, ^{3}He), (p, n), (p, p') reactions on protons and nuclei with Δ excitation are discussed and summarized. New possibilities for investigation of coherent pion production are discussed. We point out that experiments at various energies with different projectiles offer a possibility to separate partial contributions of mechanisms of charge-exchange reactions with excitation of broad baryonic resonances (Δ and N* (1440)) in nuclei. The importance of interference effects in this class of reactions is stressed. We discuss the (d, d') reaction on protons and nuclei, which gives a possibility to study polarization effects in reactions with resonance excitations. Such information in the Δ, Roper and overlapping region, where interference between these resonances might be essential, can help much in understanding their properties and underlying mechanisms of the reactions considered. It is particularly important for the theory of charge-exchange reactions at intermediate energies which cannot at present provide quantitative description of these reactions with nuclei. (author). 28 refs.; 6 figs.

8927 (JINR-E–1-94-279) **Polarization Observables for the Collinear dp → ^{3} Heπ^0 Reaction.** Ladygin, V.P.; Ladygina, N.B. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of High Energy. 1994. 14p. Order Number DE95614023. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Yadernaya Fizika.

Effects due to polarizations of both colliding particles have been analyzed in terms of two independent amplitudes which in the general case define the spin structure of the amplitude of the dp → ^{3} Heπ^0 reaction in collinear geometry. The energy dependence of spin-correlation $C_{L,L,O,O}$ due to longitudinal polarization of colliding particles is predicted using the moduli of amplitudes extracted from experimental data. The limit of possible deviations is obtained for spin-correlation $C_{N,N,O,O}$ due to transverse polarization of both particles. The value of these polarization observables at threshold are predicted. The behaviour of these polarization observables for the dp → ^{3} Heη^0 reaction, having the same spin structure, is discussed. 22 refs., 5 figs., 2 tabs.

8928 (JINR-E–1-94-311) **Pion Momentum Spectra in Nuclear Charge Exchange Reactions A(t, ^{3} He).** Avramenko, S.A. (Joint Inst. for Nuclear Research, Dubna (Russian Federation)); Aksinenko, V.D.; Anikina, M.Kh. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of High Energy. 1994. 7p. Order Number DE95614024. Source: OSTI; NTIS (US Sales Only); INIS.

The charge exchange reaction (t, ^{3} He) on carbon and magnesium targets was investigated in experiments using a streamer chamber. The experimental longitudinal momentum spectrum for events with single secondary pion was compared with the calculated one. Only 60-70% of pions were shown may be produced by quasi-free Δ^- excitation in the target nucleus. The momentum of the remaining pions was significantly higher than for delta pions and the coherent production in the projectile complementary to coherent production via N(1440) or/and N(1520) in the target nucleus was suggested. 24 refs., 3 figs., 1 tab.

8929 (JINR-E–7-94-245) **JINR Heavy Ion Program of Low and Medium Energies.** Oganessian, Yu.Ts.; Penionzhkevich, Yu.E. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Reactions. 1994. 18p. Order Number DE95613969. Source: OSTI; NTIS (US Sales Only); INIS.

Invited talk at the International Conference on Mesons and Nuclei at Intermediate Energies, Dubna, May 3-7, 1994.

The JINR heavy ion program of low and medium energies carried out at the Flerov Laboratory of Nuclear Reactions is discussed. The present status of the available accelerator facilities as well as of experimental set-ups is presented. Results are reported on the synthesis of new isotopes and reaction mechanism studies. Some projects are also discussed. (author). 31 refs.; 15 figs.; 6 tabs.

8930 (JINR-E–7-94-286) **Synthesis and Properties of Superheavy Nuclei.** Oganessian, Yu.Ts. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Reactions. 1994. 10p. Order Number DE95614045. Source: OSTI; NTIS (US Sales Only); INIS.

Presented on the Fifth International Conference on Nucleus-Nucleus Collisions, Taormina (IT), May 30 - Jun 4, 1994.

The mechanism of production and decay of excited compound nuclei leading to production of isotopes of trans actinide elements in the vicinity of closed deformed shells Z = 108, N = 162 is being considered. The implementation of experiments is described and data on synthesis of new isotopes $^{262}104$, ^{265,266} 106 and ^{267} 108

in hot fusion reactions is presented. The properties of the new nuclides point to a considerable increase of the periods of spontaneous fission predicted by the macro-microscopic theory. Prospects for using fusion reactions in synthesizing new elements are discussed.(author). 30 refs.; 9 figs.; 2 tabs.

8931 (JINR-E–7-94-315) **Spontaneous Fission of Light Californium Isotopes Produced in the ^{206,207,208}Pb + ^{34,36}S Reactions; New Nuclide ^{238}Cf.** Lazarev, Yu.A.; Shirokovskij, I.V.; Utenkov, V.K.; Tret'yakova, S.P.; Kutner, V.B. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Reactions. 1994. 12p. Order Number DE95614046. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Nuclear Physics. A.

In bombardments of ^{206}Pb, ^{207}Pb, ^{208}Pb with ^{34}S and ^{206}Pb with ^{36}S, we identified a new spontaneously fissioning isotope ^{238}Cf with $T_{sf} \approx T_{1/2} = 21 \pm$ ms and obtained evidence of the production of a new isotope ^{237}Cf with $T_{1/2} = 2{,}1 \pm 0{,}3$ s. We measured spontaneous fission branches for ^{242}Cf and ^{240}Cf to be $b_{sf} \leq 1{,}4 \times 10^{-4}$ and $b_{sf} \approx 2 \times 10^{-2}$, respectively. For ^{237}Cf, we estimated b_{sf} to be $\approx 10^{-1}$. The measured production cross sections of ^{238}Cf in the ^{206,207,208}Pb + ^{34}S reactions are in the range of 0,3 to 1,1 nb. We probed also the influence of the neutron excess in the N = 20 projectile ^{36}S on cross sections of fusion-evaporation fusion-evaporation reactions occurring on lead targets. 19 refs., 3 figs., 2 tabs.

8932 (JINR-R–1-94-240) **Study of Features in Particle and Event Characteristics in Nucleus-Nucleus Interaction.** Ermakov, K.N. (AN SSSR, Leningrad (Russian Federation). Inst. Yadernoj Fiziki); Rogachevskij, O.V.; Stabnikov, M.V.; Solov'ev, M.I.; Cheplakov, A.P.; Fadeev, N.G. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1994. 19p. (In Russian). Order Number DE95614025. Source: OSTI; NTIS (US Sales Only); INIS.

The features of π^- - mesons production in (p, d, He, C) + C interactions are investigated. There was impulse of 4.2 GeV/c per nucleon for p, d, He, C and the initial impulse 1.7 GeV/c per nucleon for d. Using the various variables allows us to find out the nature of changes in the behaviour of mean characteristics of the π^- - mesons. The study of the dependence of mean multiplicity of charged particles, of mean multiplicity of π^- - mesons and the number of the interacting nucleons of the events versus the order of π^- - meson cumulativity was carried out. It indicates the correlations between inclusive features of the particles and collective characteristics of the events. (author). 17 refs.; 10 figs.; 3 tabs.

8933 (JINR-R–1-94-260) **Rapidity Distributions of Protons in (p, d, α, C)C-Interactions at 4.2 GeV/c per Nucleon.** Bekmirzaev, R.N.; Kladnitskaya, E.N.; Muminov, M.M.; Sharipova, S.A. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of High Energy. 1994. 12p. (In Russian). Order Number DE95613993. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Yadernaya Fizika.

The dependences of proton rapidity distributions on transverse momentum for pC, dC, αC and CC interactions at 4.2 GeV/c per nucleon are studied. The experimental results are compared with the calculations according to the quark-gluon string model. It is shown that QGSM satisfactorily describes the experimental data. The contributions of protons emitted from decays of Δ^{++}, Δ^{+}, Δ^{0} isobars and of direct ones to multiplicities of protons in different rapidity bins and in different p_t intervals have been determined with the help of above model. (author). 9 refs., 7 figs., 4 tabs.

8934 (JINR-R–1-94-274) **Final State Interactions in ^{3}Hep-Collisions.** Glagolev, V.V. (Joint Inst. for Nuclear Research, Dubna (Russian Federation)); Lebedev, R.M.; Pestova, G.D. Warsaw-Dubna-Kosice-Moscow-Tbilisi Collaboration. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of High Energy. 1994. 10p. (In Russian). Order Number DE95614026. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Yadernaya Fizika.

Experimental results on momentum deuteron distributions, Wilkin angles and four momentum transfer in ^{3}Hep → d pp and ^{3}Hep → pp n reactions in full kinematic region have been obtained. The essential role of the interaction in final state with deuteron production has been observed. (author). 6 refs., 6 figs., 1 tab.

8935 (JINR-R–1-94-285) **Coherent Dissociation ^{12}C → 3α in Emulsion Enriched by Pb.** Belaga, V.V. (Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of High Energy); Rusakova, V.V.; Chernov, G.M.; Benjaza, A.A.; Salomov, D.A. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of High Energy. 1994. 12p. (In Russian). Order Number DE95614047. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Yadernaya Fizika.

Transverse momentum distributions and correlation characteristics of relativistic α-particles were studied for the coherent dissociation of carbon nucleus into three alphas at p_0=4.5 GeV/c in emulsion enriched by Pb. The comparative analysis of the data obtained in usual and enriched by Pb emulsion stacks was made. It was shown that the statistical model of rapid fragmentation doesn't describe the momentum and correlation characteristics of α-particles in the rest system of fragmentating carbon nucleus. The decay temperature of ^{12}C was estimated: it exhibits a weak dependence on target atomic number. It was shown that the fragmentating projectile nucleus acquires the angular momentum during collision. (author). 14 refs., 5 figs., 2 tabs.

8936 (JINR-R–1-94-289) **Inclusive π^0 Production in pC and pCu Interactions at 4,5 GeV/c.** Abraamyan, Kh.U. (Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of High Energy); Iz"yurov, V.M.; Kozhin, M.A.; Melkumov, G.L.; Khachaturyan, M.N.; Chatrchyan, S.A.; Khudaverdyan, A.G. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of High Energy. 1994. 10p. (In Russian). Order Number DE95613994. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Yadernaya Fizika.

Distributions for transverse momentum P_T and Feynman variable X_F of inclusive neutral pions are measured with a lead glass calorimeter in p + C → π0 + X and p + Cu → π0 + X reactions at 4,5 GeV/c. The target-mass dependence for π0 production in regions $0{,}62 \leq X_F \leq 0{,}98$ and $0{,}05 \leq P_T^2 \leq 0{,}26$ (GeV/c)^2 is presented. (author). 13 refs., 6 figs., 1 tab.

8937 (LA-UR–94-4203) **Gamma-ray measurements at the WNR white neutron source.** Nelson, R.O.; Wender, S.A.; Mayo, D.R. Los Alamos National Lab., NM (United States). [1994]. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9411185–1: NEANC specialist's meeting on measurement, calculation, and evaluation of photon production data, Bologna (Italy), 9-11 Nov 1994). Order Number DE95005210. Source: OSTI; NTIS; INIS; GPO Dep.

Photon production data have been acquired in the incident neutron energy range, $1 < E_n < 400$ MeV, for a number of target nuclei, gamma-ray energy ranges, and reactions, using the continuous-energy neutron beam of the WNR facility at Los Alamos. Gamma-ray production measurements using high resolution Ge detectors have been employed for gamma-rays in the energy range, $0.1 < E_\gamma < 10$ MeV. These measurements allow identification of reactions from the known energies of the gamma-ray transitions between low-lying states in the final nucleus. Some of the targets studied include: N, O, Al, Na, ^{56}Fe, and ^{207,208}Pb. These data are useful both for testing nuclear reaction models at intermediate energies and for numerous applied purposes. BGO detectors do not have the good energy resolution of Ge detectors, but have much greater detection efficiency for gamma rays with energies greater than a few MeV. We have used an array of 5 BGO detectors to measure cross sections and angular distributions for photon production from C and N. A large, well-shielded BGO detector has been used to measure fast neutron capture in the giant resonance region with a maximum gamma-ray energy of 52 MeV. We present results of our study of the isovector giant quadrupole resonance in ^{41}Ca via these capture measurements. Recent measurements of inclusive photon spectra from our neutron proton Bremsstrahlung experiment have been made using a gamma-ray telescope to detect gamma-rays in the energy range, $40 < E_\gamma < 300$ MeV. This detector is briefly described. The advantages and disadvantages of these detector systems are discussed using examples from our measurements. The status of current measurements is presented.

8938 (LA-UR–94-4343) **Gamma-ray production experiments at the WNR white neutron source.** Nelson, R.O.; Wender, S.A. Los Alamos National Lab., NM (United States). [1994]. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9411186–1: 1. IAEA research coordination meeting on measurement, calculation and evaluation of photon production data, Bologna (Italy), 14-17 Nov 1994). Order Number DE95005250. Source: OSTI; INIS; NTIS; GPO Dep.

Using the WNR white neutron source, photon production data have been acquired in the incident neutron energy range, $3 < E_n < 400$ MeV, for a number of target nuclei using BGO detectors and high-resolution Ge detectors. The gamma-ray energy rang covered is $0.1 < E_\gamma < 10$ MeV for the Ge detectors and $1.0 < E_\gamma < 20$ MeV for the BGO detectors. The Ge detector measurements allow identification of reactions from the known energies of the gamma-ray transitions between low-lying states in the final nucleus. The lower resolution BGO data were also for discrete transitions. The data are useful both for testing nuclear reaction models at intermediate energies and for numerous applied purposes. We list the target nuclei studied to date and the status of the data.

8939 (UM-P–93/111) **Ambiguities in strong absorption parametrisations of nuclear scattering data.** Steward, C. (University of South Africa (UNISA), Pretoria (South Africa). Dept. of Physics); Fiedeldey, H.; Amos, K.; Allen, L.J. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 17p. Order Number DE95616427. Source: OSTI; NTIS (US Sales Only); INIS.

Fixed energy inverse scattering methods have been applied to extract ^{12}C - ^{208}Pb inversion potentials from measured differential cross sections. A semiclassical (WKB) inversion scheme was used to ascertain those complex, local interactions for the data taken at 1449 MeV. The first step was to fit the differential cross section data with a McIntyre form for the S-function. Then each McIntyre S-function was mapped into a rational function representation with which the inversion was performed. The inversion potentials vary significantly in their absorption components within the sensitive radial regions. The results highlight the crucial importance of making more extensive and accurate measurements of cross section data before a much further understanding can be made of heavy ion collisions. 18 refs., 3 tabs., 3 figs.

8940 (UM-P–94/7) **Measurement of de-excitation γ-rays following the photodisintegration of ^{16}O: a test of the quasi-deuteron model in photonuclear reactions above the GDR.** Kuzin, A. (Melbourne Univ., Parkville, VIC (Australia). School of Physics); Sims, D.A.; Rassool, R.P.; Thompson, M.N.; Tetasawa, T.; Itoh, H.; Konno, O. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 14p. Order Number DE95616412. Source: OSTI; NTIS (US Sales Only); INIS.

One of the thrusts of the research program of the photonuclear tagging group is aimed at resolving the nature of the mechanism whereby a high energy photon ($\approx$ 100 MeV) causes protons, neutrons, and correlated p-n paris to be emitted from a nucleus. This report describes the results of a preliminary experiment where de-excitation γ -rays were detected from states in ^{15}N following the $^{16}O(\gamma,p)$ reaction. The feasibility of this experimental method in this energy region is discussed, and it is concluded that it will be possible to resolve the nature of the reaction mechanism using this method. 7 refs., 4 figs.

8941 (UM-P–94/33) **The Mott-Schwinger effect in neutron elastic scattering from ^{209}Bi.** Alexander, N. (Melbourne Univ., Parkville, VIC (Australia). School of Physics); Amos, K.; Berge, L. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 29p. Order Number DE95616415. Source: OSTI; NTIS (US Sales Only); INIS.

The Mott-Schwinger (MS) potential arising from the interaction of the magnetic moment of a neutron incident upon an electric field (of ^{209} Bi) is found to have a profound effect upon the elastic scattering cross sections and polarisations at 0.5, 14.5 and 24 MeV. Those effects are evaluated by specific solution of the relevant Schroedinger equations (for 100 partial waves) and with the Born approximation used to define the influence upon all higher ones. The actual calculated phase shifts and how the scattering amplitudes can be formed are then presented. One of the outcome of this study is the development of a fast and accurate method for evaluating scattering observables and wave functions with the inclusion of the MS potential in the Schroedinger equation. The formalism and methods may be now applied in analyses of (p, n) and other reactions in which the MS interaction potential could be significant. 14 refs., 2 tabs., 4 figs.

8942 (UM-P–94/38) **Ambiguities in strong absorption S-functions and corresponding potentials for heavy ion collisions.** Steward, C. (University of South Africa (UNISA), Pretoria (South Africa). Dept. of Physics); Fiedeldey, H.; Amos, K.; Allen, L.J. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 23p. Order Number DE95616428. Source: OSTI; NTIS (US Sales Only); INIS.

A semiclassical (WKB) method within fixed energy inverse scattering theory has been used to analyse the differential cross section from the elastic scattering of 1449 MeV ^{12}C ions off of ^{208}Pb. Excellent, statistically significant, fits to the experimental data have been found using a McIntyre form for the scattering function but with diverse sets of parameter values. Inversion of those scattering functions resulted in interaction potentials for this system that are also quite diverse. In addition, conventional optical model potentials have been obtained with which direct solution of the Schroedinger equations result in similar excellent fits to the data. It is shown that these large ambiguities in the potentials are due, in the main, to the limited angular range of the cross-section data and although the corresponding cross-section shapes beyond the measured scattering angle range vary over many orders of magnitude, it is unlikely that experiments can be made sensitive enough to select from among them because those cross sections are so small. 23 refs., 3 tabs., 6 figs.

8943 (UM-P–94/41) **The evaluation of specific types of integrals involving confluent hypergeometric functions.** Di Marzio, F. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 9p. Order Number DE95616435. Source: OSTI; NTIS (US Sales Only); INIS.

Closed analytic expressions are presented for a specific class of integrals arising in pion (or kaon) scattering from nuclei. These provide a computationally convenient description of such scattering whenever modified plane wave approximations for the continuum wave functions are valid. Similar results are derived for two other classes of related integrals. Finite series representations for various special functions are also presented. 7 refs.

6635 Nuclear Mass Ranges

Refer also to citation(s) 8105, 8820, 8845, 8846, 8851, 8854, 8866, 8869, 8870, 8879, 8880, 8881, 8882, 8883, 8884, 8885, 8886, 8887, 8888, 8889, 8890, 8891, 8892, 8893, 8894, 8895, 8897, 8899, 8903, 8904, 8906, 8907, 8914, 8919, 8923, 8927, 8928, 8930, 8934, 8936, 8937, 8939, 8940, 8941, 8942

6636 Radiation Physics

Refer also to citation(s) 7314

8944 (CNIC–00750, pp. 99-108) **Calculation of thermal neutron scattering law for anisotropic microcrystals.** Hu Yongming (Qinghua Univ., Beijing, BJ (China). Inst. of Nuclear Energy Technology); Zhong Wenfa. China Nuclear Information Centre, Beijing, BJ (China); Chinese Nuclear Data Center, Beijing, BJ (China). Jun 1993. (CNDC–0012; INDC(CPR)–030/L.). In *Communication of nuclear data progress: No.9 (1993).* 113p. Order Number DE95613323. Source: OSTI; NTIS (US Sales Only); INIS.

A method of calculating thermal neutron scattering law for anisotropic microcrystals which is based on Fourier transform is derived. A formula for Debye-Waller factor is derived, too. Results of anisotropic graphite scattering law by the code SCAT-3 based on the method are presented. It is shown that the method is accurate and efficient and that it is very important to take a correct value of Debye-Waller factor.

8945 (INIS-mf–14440, pp. 5) **Modulation transfer function measurement for the film-converter imaging technique in neutron radiography.** Kamali Moghadam, K.; Afarideh, H.; Habibi, M.F. Iranian Physics Society, Teheran (Iran, Islamic Republic of);

Atomic Energy Organization of Iran, Teheran (Iran, Islamic Republic of). Aug 1994. 91p. (In English, Persian). (CONF-9408203–: Annual physics conference of Iran, Sanandaj (Iran, Islamic Republic of), 19 Aug - 1 sep 1994). In *Abstracts of annual physics conference of Iran, 1373 Kordestan University.* Order Number DE95611717. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. NEUTRON RADIOGRAPHY; IMAGES; NEUTRON CAMERAS; NEUTRON DETECTION; RESOLUTION; TRANSFER FUNCTIONS

8946 (INIS-RU–377, pp. 107) **Energy dependence of radiation yield of resonance nuclear reactions prompted by channeled protons in axial and plane channels of Nb-N_x and Re-C_x systems.** Grinchenko, A.Yu.; Deev, A.S.; Molodkin, V.V. AN SSSR, Moscow (Russian Federation); Moskovskij Gosudarstvennyj Univ., Moscow (Russian Federation). Nauchno-Issledovatel'skij Inst. Yadernoj Fiziki. 1993. 148p. (In Russian). (CONF-9305364–: 23. International meeting on the physics of charged particle interaction with crystals, Moscow (Russian Federation), 31 May - 2 jun 1993). In *Thesies of the proceedings of the 23. International meeting on the physics of charged particle interaction with crystals.* Order Number DE94631501. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. 1 tab. PROTON CHANNELING/nuclear reaction yield; ALPHA PARTICLES; CARBON 12; CARBON 13 TARGET; COMPUTERIZED SIMULATION; GAMMA RADIATION; NIOBIUM COMPOUNDS; NIOBIUM NITRIDES; NITROGEN 14; NITROGEN 15 TARGET; PROTON REACTIONS; RHENIUM COMPOUNDS; RHENIUM NITRIDES

8947 (JINR-E–13-94-257) **Small Angle Neutron Scattering Facility for Low and High Power Reactors.** Maayouf, R.M.A. (Atomic Energy Establishment, Cairo (Egypt)); Aksenov, V.L.; Kiselev, M.A.; Kuklin, A.I.; Serdyuk, I.N.; Smirnov, A.S. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Neutron Physics. 1994. 8p. Order Number DE95614094. Source: OSTI; NTIS (US Sales Only); INIS.

A possibility to use a small angle neutron scattering (SANS) facility at the ET-RR-1 reactor is discussed. The type of SANS facility which could be used at such a reactor, and a higher power one, is suggested. The facility under discussion allows both for slit and axially symmetric geometries. It has been found that the axially symmetric geometry combined with a ring-wire detector is preferable as it offers higher luminosity and a smaller correction of the resolution function. (author). 12 refs.; 1 fig.; 1 tab.

8948 (LA–12884) **Benchmark analysis of MCNP™ ENDF/B-VI iron.** Court, J.D.; Hendricks, J.S. Los Alamos National Lab., NM (United States). Dec 1994. 140p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. Order Number DE95004863. Source: OSTI; NTIS; INIS; GPO Dep.

The MCNP ENDF/B-VI iron cross-section data was subjected to four benchmark studies as part of the Hiroshima/Nagasaki dose reevaluation for the National Academy of Science and the Defense Nuclear Agency. The four benchmark studies were: (1) the iron sphere benchmarks from the Lawrence Livermore Pulsed Spheres; (2) the Oak Ridge National Laboratory Fusion Reactor Shielding Benchmark; (3) a 76-cm diameter iron sphere benchmark done at the University of Illinois; (4) the Oak Ridge National Laboratory Benchmark for Neutron Transport through Iron. MCNP4A was used to model each benchmark and computational results from the ENDF/B-VI iron evaluations were compared to ENDF/B-IV, ENDF/B-V, the MCNP Recommended Data Set (which includes Los Alamos National Laboratory Group T-2 evaluations), and experimental data. The results show that the ENDF/B-VI iron evaluations are as good as, or better than, previous data sets.

8949 (LA–12885) **Lawrence Livermore pulsed sphere benchmark analysis of MCNP™ ENDF/B-VI.** Court, J.D.; Brockhoff, R.C.; Hendricks, J.S. Los Alamos National Lab., NM (United States). Dec 1994. 142p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. Order Number DE95004864. Source: OSTI; NTIS; INIS; GPO Dep.

Twenty-eight Lawrence Livermore pulsed sphere experiments were modeled using MCNP for the purpose of bench- marking the new MCNP ENDF/B-VI data library. The twenty-eight pulsed sphere experiments contain thirty-four of the 124 isotopic or elemental evaluations contained in the new ENDF/B-VI set. The ENDF/B-VI results are compared to experimental neutron time-of-flight data, the results obtained from using ENDF/B-V, and against an additional data set, the MCNP Recommended Library, which includes Los Alamos group T-2 evaluations. The results show that ENDF/B-VI results give better or comparable results in comparison to experiment to ENDF/B-V in many cases, and do not deviate grossly in the other cases.

8950 (SLAC-PUB–6625) **EGS4 in '94: A decade of enhancements.** Nelson, W.R. (Stanford Univ., CA (United States)); Bielajew, A.F.; Rogers, D.W.O.; Hirayama, H. Stanford Univ., CA (United States). 18 Aug 1994. 18p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-940802–2-Vugraphs: World congress on medical physics and biomedical engineering jointly with the international conference on medical physics, Rio de Janeiro (Brazil), 22-26 Aug 1994). Order Number DE95006055. Source: OSTI; NTIS; INIS; GPO Dep.

This paper presents an overview of the developments made to the EGS4 code over the past decade. This code is a Monte Carlo code developed to study electron-photon transport properties. It is widely used, in particular in the medical physics field, it has been updated, expanded, benchmarked, and applied to a wide array of problems. The paper covers precursors to this code, a basic snapshop of its physics and calculation methods, and an overview of how it has been expanded during the past decade.

6641 Theory of Electronic Structure of Atoms and Molecules

8951 (ANL/PHY/CP–84545) **Atoms as many-body systems.** Amusia, M.Ya. (Argonne National Lab., IL (United States)). Argonne National Lab., IL (United States). [1995]. 34p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9405247–2: Harmony of physics conference, Philadelphia, PA (United States), 8-9 May 1994). Order Number DE95004609. Source: OSTI; NTIS; INIS; GPO Dep.

The author presents this article in the volume, dedicated to the 70th birthday of Academician S. T. Belyaev. He has known him personally since 1961 and admires his profound contributions to the theory of Bose-liquids, to the theory of superconductivity of atomic nuclei and some other important scientific works. Belyaev is well known also as an organizer of science and education. For years he was, and is still the Chairman of the Synchrotron Radiation Commission of the Russian Academy of Science, a body which was established long ago to promote construction of high intensity light sources, and technological as well as scientific research using this light. One of the important directions of this study is investigation of photoabsorbtion by multielectron atoms in order to obtain information about their structure.

8952 (IC–94/295) **Inner- and outer-shell excitation in lithium isoelectronic sequence.** Tiwary, S.N. (International Centre for Theoretical Physics, Trieste (Italy)); Kumar, P. International Centre for Theoretical Physics, Trieste (Italy). Sep 1994. 13p. Order Number DE95614107. Source: OSTI; NTIS (US Sales Only); INIS.

The inner-shell excitation $1s^22s^2S^e \rightarrow 1s2s^2\ ^2S^e$, which leads to autoionization (Auger transition), as well as the outer-shell excitation $1s^22s\ ^2S^e \rightarrow 1s^22p\ ^2P^0$ transitions have been investigated in Li, Be^+, B^{2+} and C^{3+} ions of the lithium isoelectronic sequence employing the configuration interaction wave functions for both the initial and final states involved in the transition matrix element. Results are compared with other available theoretical predictions and experimental observations. Comparison shows that our present theoretical results are encouraging. (author). 33 refs, 5 tabs.

6642 Spectra of Atoms and Molecules and Their Interactions With Photons

Refer also to citation(s) 8169, 8404

8953 (BUDKERINP–94-56) **Nuclear-spin-dependent parity-nonconserving effects in thallium, lead and bismuth atoms.** Khriplovich, I.B. AN SSSR, Novosibirsk (Russian Federation). Inst.

Yadernoj Fiziki. 1994. 17p. (IYaF–94-56.). Order Number DE95614120. Source: OSTI; NTIS (US Sales Only); INIS.

Nuclear-spin-dependent P-odd optical activity in atomic Tl, Pb and Bi is calculated. Its magnitude is expressed analytically through the main contribution to the optical rotation, which is independent of nuclear spin. The accuracy of results is discussed. 31 refs., 2 tabs.

8954 (IA–1486, pp. 32-35) **Photon flux optimization in three-color multiphoton ionization of uranium atoms.** Levron, D.; Bar-Shalom, A.; Burshtein, Z.; Davis, R.; Hazak, G.; Ivry, J.; Levin, L.A.; Oreg, J.; Srauss, M. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993*. 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Ionization probability in three-color excitation of uranium atoms depends on the photon flux which drives the transition to an autoionization level. for a proper choice of the flux ratio, the ionization probability is insensitive of the actual fluxes over a considerable range (Table 1). Thus, the laser intensities used may be lowered by a factor of 3 as compared with values predicted on the basis of cross-sections of the individual transition. A quantum mechanical model (see figure 1), based on a detailed calculation of population dynamics of the levels in ionization scheme, predicts the ionization probability as a function of the three laser intensities. Ionization saturation measurements provide parameters for the model. The theoretical calculations were partially consistent with the experimental results (see figure 2). Ionization probabilities as high as 93% are achievable (authors). 1 ref.; 1 tab.; 2 figs.

8955 (IC–94/221) **A study of luminescence and absorption spectra of GaP.** Mansour, H.M.M. (Cairo Univ. (Egypt). Dept. of Physics); Mounir, M.; Abdel Wahab, S.M. International Centre for Theoretical Physics, Trieste (Italy). Aug 1994. 17p. Order Number DE95614122. Source: OSTI; NTIS (US Sales Only); INIS.

Experimental luminescence and absorption spectra of GaP at room temperature are presented. A theoretical analysis has been performed on the luminescence and absorption spectra in GaP. The experimental data are in good agreement with the theoretical results. (author). 18 refs, 8 figs.

8956 (IC–94/243) **Probe transparency in a two-level medium embedded by a squeezed vacuum.** Swain, S. (Queen's Univ., Belfast, Northern Ireland (United Kingdom). Dept. of Applied Mathematics); Zhou, P. International Centre for Theoretical Physics, Trieste (Italy). Aug 1994. 22p. Order Number DE95614123. Source: OSTI; NTIS (US Sales Only); INIS.

Effect of the detuning on the probe absorption spectra of a two-level system with and without a classically driven field in a squeezed vacuum is investigated. For a strong squeezing, there is a threshold which determines the positions and widths of the absorption peaks, for the squeezed parameter M. In a large detuning, the spectra exhibit some resemblance to the Fano spectrum. The squeezing-induced transparency occurs at the frequency $2\omega_L - \omega_A$ in the minimum-uncertainty squeezed vacuum. This effect is not phase-sensitive. (author). 15 refs, 8 figs.

8957 (UM-P–94/17) **Reflection and diffraction of atomic de Broglie waves by evanescent laser waves. Bare-state method.** Feng, Xiaoping; Witte, N.S.; Hollenberg, C.L.; Opat, G. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 17p. Order Number DE95616458. Source: OSTI; NTIS (US Sales Only); INIS.

Two methods are presented for the investigation of the reflection and diffraction of atoms by gratings formed either by standing or travelling evanescent laser waves. Both methods use the bare-state rather than dressed-state picture. One method is based on the Born series, whereas the other is based on the Laplace transformation of the coupled differential equations. The two methods yield the same theoretical expressions for the reflected and diffracted atomic waves in the whole space including the interaction and the asymptotic regions. 1 ref., 1 fig.

6643 Collision Phenomena

Refer also to citation(s) 8183, 8184, 8185

8958 (ANL/PHY/CP–84104) **The interactions of high-energy, highly charged Xe ions with buckyballs.** Ali, R. (and others); Berry, H.G.; Cheng, S. Argonne National Lab., IL (United States). [1994]. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9410275–1: Interaction of charged particles and radiation with matter, Oak Ridge, TN (United States), 23-25 Oct 1994). Order Number DE95004597. Source: OSTI; NTIS; INIS; GPO Dep.

Ionization and fragmentation have been measured for C_{60} molecules bombarded by highly charged (up to 35+) xenon ions with energies ranging up to 625 MeV. The observed mass distribution of positively charged fragments is explained in terms of a theoretical model indicating that the total interaction cross section contains roughly equal contributions from (a) excitation of the giant plasmon resonance, and (b) large-energy-transfer processes that lead to multiple fragmentation of the molecule. Preliminary results of measurements on VUV photons emitted in these interactions are also presented.

8959 (DOE/ER/13520–T1) **Electron-atom collision studies using optically state selected beams. Progress report, May 15, 1987–May 14, 1988.** Celotta, R.J.; Kelley, M.H. National Inst. of Standards and Technology (NML), Gaithersburg, MD (United States). Electron and Optical Physics Div. 15 Nov 1988. 36p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AI01-86ER13520. Order Number DE95004446. Source: OSTI; NTIS; INIS; GPO Dep.

This report discusses progress made during the current contract period on the authors research program to study collisions between spin-polarized electrons and optically prepared atoms. The objective of this work is to stimulate a deeper theoretical understanding of the electron-atom interaction by providing more complete experimental measurements on colliding systems. By preparing the internal states of the collision partners before scattering, they are able to extract substantially more information about the scattering process than is available from more conventional measurements of differential cross sections. The authors are principally interested in observing the role played by spin in low energy electron-atom collisions. The additional information provided by these spin-dependent measurements can greatly enhance understanding of both exchange and the spin-orbit interaction in the scattering process. They have made substantial progress in the past three years in their measurements both of elastic and superelastic scattering of spin-polarized electrons from optically pumped sodium.

8960 (DOE/ER/13520–T2) **Electron-atom collision studies using optically state selected beams. Progress report, May 15, 1988–May 14, 1991.** Celotta, R.J.; Kelley, M.H. National Inst. of Standards and Technology (NML), Gaithersburg, MD (United States). Electron and Optical Physics Div. 15 Nov 1990. 29p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AI01-86ER13520. Order Number DE95004447. Source: OSTI; INIS; NTIS; GPO Dep.

This report discusses progress made during the current contract period on the authors research program to study collisions between spin-polarized electrons and spin-polarized atoms. The objective of this work is to stimulate a deeper theoretical understanding of the electron-atom interaction by providing the most complete possible experimental characterization of the colliding system. Through the use of optical state preparation techniques to prepare both the incident electrons and atom in well-defined initial states, the authors are able to extract substantially more information about the scattering process than is available from more conventional measurements of differential scattering cross sections. Their primary interest is to study in detail the role played by spin in electron-atom collisions at low to intermediate energies. The additional information provided by these spin-dependent measurements greatly enhances understanding of both exchange and the spin-orbit interaction in the scattering process. During this three-year period they have made substantial progress in measurements of both elastic and superelastic scattering of spin-polarized electrons from optically pumped sodium. The elastic scattering measurements in particular were made possible by several important improvements to the experimental apparatus.

8961 (FEI–2257) **Study on space-time evolution of plasma of heavy charged particle track in noble gases.** Budnik, A.P.; Sokolov, Yu.V. Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk (Russian Federation). Fiziko-Ehnergeticheskij Inst. 1992. 20p. (In Russian). Order Number DE95614132. Source: OSTI; NTIS (US Sales Only); INIS.

The result of theoretical investigation of space-time track evolution created by heavy charged particles plasma in noble gases are presented. The model of track evolution taking into account the processes of electron and ion diffusion, electron energy relaxation due to collision, molecular ion formation, electron-ion recombination due to the ternary collision are considered. The electrical field formation and the charged particles drift under action of this field are took into account. The results of mathematical simulation of processes in track in helium are represented. The calculated results of ionization cross-section of helium atoms with fission fragments are compared with experimental data. 7 figs.

8962 (IA–1486, pp. 5) **Three-dimensional study of reactive diatom-diatom system. Quantum mechanical state-to-state cross sections for the H_2+OX->H+OX: X=H,D reactions.** Szichman, H.; Last, I.; Baer, M. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. HEAVY WATER/isotopic exchange; DEUTERIUM; ENERGY LEVELS; HYDROGEN; QUANTUM MECHANICS; THREE-DIMENSIONAL CALCULATIONS; WATER

8963 (SAND–94-8237) **Correlations for the NO $A^2\Sigma^+$ electronic quenching cross-section.** Paul, P.H. (Sandia National Labs., Livermore, CA (United States). Combustion Research Facility); Carter, C.D.; Gray, J.A.; Durant, J.L. Jr.; Thoman, J.W.; Furlanetto, M.R. Sandia National Labs., Livermore, CA (United States). Jan 1995. 21p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. Order Number DE95006195. Source: OSTI; NTIS; INIS; GPO Dep.

This report summarizes recent progress in the development of a model for collisional electronic quenching of NO $A^2\Sigma^+$ by a number of molecules commonly found in combustion and aerodynamic systems. The model provides a means to reliably extend the measurement data base as well as suggesting simple analytic forms which can be used to provide physically plausible fits to the measurements. This report also contains a compilation of the available experimental data for collisional electronic quenching of NO $A^2\Sigma^+$.

8964 (UM-P–94/93) **Inversion of the total cross sections for electron-molecule and electron-atom scattering.** Lun, D.R.; Amos, K.; Allen, L.J. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 14p. Order Number DE95616466. Source: OSTI; NTIS (US Sales Only); INIS.

Inverse scattering theory has been applied to construct the interaction potentials from total cross sections as a function of energy for electrons scattered off of atoms and molecules. The underlying potentials are assumed to be real and energy independent and are evaluated using the Eikonal approximation and with real phase shifts determined from the total cross sections. The inversion potentials have been determined using either a high energy limit approximation or by using a fixed energy inversion method at select energies. These procedures have been used to analyse e^- - CH_4, e^-- SiH_4, e^- -Kr and e^- -Xe scattering data in particular. 14 refs., 1 tabs., 3 figs.

6644 Experimentally Derived Information On Atomic and Molecular Properties

8965 (ANL/CHM/CP–84071) **Some thoughts of future experiments with the new generation of storage rings.** Berkowitz, J. Argonne National Lab., IL (United States). [1995]. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9404198–4: Workshop on atomic physics at high brilliance synchrotron sources, Argonne, IL (United States), 23-24 Apr 1994). Order Number DE95004602. Source: OSTI; NTIS; INIS; GPO Dep.

The author presents a recounting of work he has been involved with employing vacuum ultraviolet radiation generated by laboratory sources and synchrotrons. This includes touching on early studies on the potential of synchrotron sources to generate radiation at intensities which would allow study of transient species and very weak processes. Photoionization studies of many molecular systems are discussed, and the potential of more intense sources to allow measurement of cross sections and fragmentation reactions is discussed.

6645 Special Atoms and Molecules

8966 (BUDKERINP–93-64) **Vacuum polarization correction to the positronium decay rate.** Burichenko, A.P. (AN SSSR, Novosibirsk (Russian Federation). Inst. Yadernoj Fiziki); Ivanov, D.Yu. AN SSSR, Novosibirsk (Russian Federation). Inst. Yadernoj Fiziki. 1993. 7p. (IYaF–93-64.). Order Number DE95614164. Source: OSTI; NTIS (US Sales Only); INIS.

Correction $\approx \alpha^2$ to the positronium decay rate, induced by one-loop vacuum polarization diagram, are calculated. Their relative values are $0.4468(3)(\alpha/\pi)^2$ for para-and $0.960(3)(\alpha/\pi)^2$ for orthopositronium. 9 refs., 3 figs., 2 tabs.

8967 (INIS-mf–13801, pp. RC16) **Fast successive charge captures in the positron spur by halogenated compounds in methanol.** Didierjean, F. (Strasbourg-1 Univ., 67 (France). Centre de Recherches Nucleaires); Abbe, J.Ch.; Duplatre, G. Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico); Instituto de Investigaciones Electricas, Cuernavaca (Mexico); Universidad Autonoma del Estado de Morelos (UAEM), Cuernavaca (Mexico). 1992. 30p. (CONF-9208272–: 9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry, Cuernavaca (Mexico), 16-21 Aug 1992). In *9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry. Abstracts.* Order Number DE95611878. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. ELECTRONS/positrons; HALOGEN COMPOUNDS/methanol; BOUND STATE; DOPPLER BROADENING; ELECTRONS; POSITRONS; METHANOL; IONIZATION; MERCURY CHLORIDES; POSITRONIUM; SOLVENTS

8968 (INIS-mf–13801, pp. NAT2) **Fast reactions in the positron spur in polar solvents.** Duplatre, G. (Strasbourg-1 Univ., 67 (France). Centre de Recherches Nucleaires). Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico); Instituto de Investigaciones Electricas, Cuernavaca (Mexico); Universidad Autonoma del Estado de Morelos (UAEM), Cuernavaca (Mexico). 1992. 30p. (CONF-9208272–: 9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry, Cuernavaca (Mexico), 16-21 Aug 1992). In *9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry. Abstracts.* Order Number DE95611878. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. REACTION KINETICS/positronium; SOLVENTS/solutes; CORRELATIONS; ELECTRONS; MOLECULES; PARTICLE RAPIDITY; POSITRONS; POSITRONIUM; SOLVATION; SOLVENTS; SOLUTES

8969 (INIS-mf–13801, pp. NAT4) **Positronium interactions with transition metals in sodium dodecyl sulfate micellar systems (SDS).** Reynoso, R. (Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico)); Serrano, J.; Fucugauchi, L.A. Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico); Instituto de Investigaciones Electricas, Cuernavaca (Mexico); Universidad Autonoma del Estado de Morelos (UAEM), Cuernavaca (Mexico). 1992. 30p. (CONF-9208272–: 9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry, Cuernavaca (Mexico), 16-21 Aug 1992). In *9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry. Abstracts.* Order Number DE95611878. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. POSITRONIUM/interactions; POSITRONIUM/reactivity; AQUEOUS SOLUTIONS; CHLORIDES; COBALT IONS; CONCENTRATION RATIO; LIFETIME; POSITRONIUM; INTERACTIONS; REACTIVITY

8970 (INS–1050) **Atomic approaches in metastable antiprotonic helium atoms. REPLY to 'analysis of the lifetimes and fractions of antiprotons trapped in metastable**

antiprotonic-helium states' by I. Shimamura and M. Kimura. Yamazaki, Toshimitsu; Ohtsuki, Kazumasa. Tokyo Univ., Tanashi (Japan). Inst. for Nuclear Study. Aug 1994. 13p. Order Number DE95737228. Source: OSTI; NTIS; INIS.

In the present note the authors clarify the purpose of YO and complement its essential points, thus showing that the criticisms of SK are inappropriate. The paper YO [1] was aimed at discussing some new aspects related to the metastability of hadronic helium atoms which had been discovered when negative kaons [2], negative pions [3] and antiprotons [4] were stopped in liquid helium. The delayed fraction, time spectrum shape and lifetimes were the observables. Further experimental studies are in progress [5], and as of today there is no successful explanation for these interesting phenomena. So, YO tried to give brief and rather qualitative estimates for the observations in an intuitive way, considering only the leading terms. The following problems are discussed in as simple a manner as possible, starting from the exotic-atom viewpoints of Condo [6] and Russell [7]: (i)the atomic core polarization effect, (ii)the structure and radiative lifetimes, (iii)the non-statistical distribution of the angular momentum and an estimate of the delayed fraction, and (iv)the isotope effect, though the title represents only (i). To respond to the comments of SK, it is important to consider the correspondence between the atomic approach and the molecular approach for the metastable antiprotonic helium atom of Condo-Russell. We therefore begin this note with a discussion of this aspect. (author).

6650 Physics of Condensed Matter

Refer also to citation(s) 8696, 8987

8971 (ANL/MSD/CP–83452) **Phonon-induced anomalous specific heat of a model nanocrystal by computer simulation.** Wang, J. (Argonne National Lab., IL (United States)); Wolf, D.; Phillpot, S.R.; Gleiter, H. Argonne National Lab., IL (United States). Oct 1994. 5p. Sponsored by USDOE, Washington, DC (United States);Leibnitz Foundation. DOE Contract W-31109-ENG-38. (CONF-941039–3: 2. international conference on nanostructured materials, Stuttgart (Germany), 3-7 Oct 1994). Order Number DE95004653. Source: OSTI; NTIS; INIS; GPO Dep.

The authors construct a simple model of a nanocrystalline material in which all the grains are the same size and shape, and in which all the grain boundaries are crystallographically identical. The authors show that the model nanocrystal has a low-temperature specific-heat anomaly similar to that seen in experiment, which arises from the presence of low-frequency phonons localized at the grain boundaries.

8972 (ANL/MSD/CP–84768) **Nanostructured materials.** Siegel, R.W. Argonne National Lab., IL (United States). Nov 1994. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9411172–1: Nanoparticulates '94 conference, Monterey, CA (United States), 14-15 Nov 1994). Order Number DE95004595. Source: OSTI; NTIS; INIS; GPO Dep.

Interest in the physics of condensed matter at size scales larger than that of atoms and smaller than that of bulk solids has grown rapidly over the past two decades owing to the increasing realization that the properties of these mesoscopic atomic ensembles are different than those of conventional solids. As a consequence, interest in artificially assembling materials from nanometer sized building blocks, whether layers or clusters of atoms, arose from discoveries that by controlling the sizes in the range of 1-100 nm and the assembly of such costituents one could begin to alter and prescribe the properties of the assembled nanostructures. Nature had already learned the value of nanostructuring, since many examples of naturally formed nanostructures can be found in biological systems from sea shells to the human body. Nanostructured materials are modulated over nanometer length scales in from zero to three dimensions. They can be assembled with modulation dimensionalities of zero (atom clusters or filaments), one (multilayers), two (ultrafine-grained overlayers or coatings or buried layers), and three (nanophase materials), or also with intermediate dimensionalities. Thus, nanocomposite materials containing multiple phases can range from the most conventional case in which a nanoscale phase is embedded in a phase of conventional sizes to the case in which all the constituent phases are of nanoscale dimensions. All nanostructured materials share three features: atomic domains (grains, layers or phases) spatially confined to less than 100 nm in at least one dimension, significant atom fractions associated with interfacial environments, and interactions between their constituent domains.

8973 (DOE/ET/53088–670) **A wavenumber-partitioning scheme for two-dimensional statistical closures.** Bowman, J.C. Texas Univ., Austin, TX (United States). Inst. for Fusion Studies. Nov 1994. 50p. Sponsored by USDOE, Washington, DC (United States);Natural Sciences and Engineering Research Council of Canada, Ottawa, ON (Canada). DOE Contract FG05-80ET53088. (IFSR–670). Order Number DE95004514. Source: OSTI; NTIS; INIS; GPO Dep.

One of the principal advantages of statistical closure approximations for fluid turbulence is that they involve smoothly varying functions of wavenumber. This suggests the possibility of modeling a flow by following the evolution of only a few representative wavenumbers. This work presents two new techniques for the implementation of two-dimensional isotropic statistical closures that for the first time allows the inertial-range scalings of these approximation to be numerically demonstrated. A technique of wavenumber partitioning that conserves both energy and enstrophy is developed for two-dimensional statistical closures. Coupled with a new time-stepping scheme based on a variable integrating factor, this advance facilitates the computation of energy spectra over seven wavenumber decades, a task that will clearly remain outside the realm of conventional numerical simulations for the foreseeable future. Within the context of the test-field model, the method is used to demonstrate Kraichnan's logarithmically-corrected scaling for the enstrophy inertial range and to make a quantitative assessment of the effect of replacing the physical Laplacian viscosity with an enhanced hyperviscosity.

8974 (DOE/ET/53088–685) **On inertial range scaling laws.** Bowman, J.C. Texas Univ., Austin, TX (United States). Inst. for Fusion Studies. Dec 1994. 29p. Sponsored by USDOE, Washington, DC (United States);Natural Sciences and Engineering Research Council of Canada, Ottawa, ON (Canada). DOE Contract FG05-80ET53088. (IFSR–685). Order Number DE95004515. Source: OSTI; NTIS; INIS; GPO Dep.

Inertial-range scaling laws for two- and three-dimensional turbulence are re-examined within a unified framework. A new correction to Kolmogorov's $k^{-5/3}$ scaling is derived for the energy inertial range. A related modification is found to Kraichnan's logarithmically corrected two-dimensional enstrophy cascade law that removes its unexpected divergence at the injection wavenumber. The significance of these corrections is illustrated with steady-state energy spectra from recent high-resolution closure computations. The results also underscore the asymptotic nature of inertial-range scaling laws. Implications for conventional numerical simulations are discussed.

8975 (IC–94/253) **Antiferromagnetic instability of heavy-fermion alloys with conduction band impurities.** Lee Chengchung (International Centre for Theoretical Physics, Trieste (Italy)); Xu Xiaohua. International Centre for Theoretical Physics, Trieste (Italy). Aug 1994. 17p. Order Number DE95614307. Source: OSTI; NTIS (US Sales Only); INIS.

The antiferromagnetic instability of heavy-fermion alloys with conduction band impurities is examined in the single-site coherent-potential approximation with the strong correlation treated by the slave-boson technique of Kotliar and Ruckenstein. The variation of paramagnetic-antiferromagnetic phase boundary with the impurity concentration has been studied in the case of isoelectronic doping. Our results show that the isoelectronic doping favours the formation of antiferromagnetism if the impurities increase the cell volume, thus suppress the c-f mixing, which is in agreement with the experimental observations in $Ce(Cu_{1-x}Ag_x)6$ and $Ce(Cu_{1-x}Au_x)6$. The obtained phase diagram can also be used to explain the effects of non-isoelectronic substitutions of Al for Cu in $CeCu_6$. (author). 19 refs, 2 figs.

8976 (IC–94/286) **Alloying effects of Kondo insulators.** Lee Chengchung (International Centre for Theoretical Physics, Trieste (Italy)); Xu Wang; Chen Chun; Xiao Mingwen. International

Centre for Theoretical Physics, Trieste (Italy). Sep 1994. 28p. Order Number DE95614308. Source: OSTI; NTIS (US Sales Only); INIS.

The effects of nonmagnetic impurities (Kondo holes) in Kondo insulators (KI) are studied which is based on the U = ∞ Anderson model in the framework of a slave-boson mean-field theory under the coherent-potential approximation (CPA). The density of states for f-electrons and its variation with the concentration of Kondo holes are calculated self-consistently. The specific-heat coefficient, residual resistivity, and the T = 0 static susceptibility in the alloying system are obtained. The results show that the insulating gap in KI can easily be smeared out by Kondo holes, and the system changes gradually from an insulator to a heavy-fermion metal with increasing concentration, which is in qualitative agreement with experiments. Furthermore, the appearance of an impurity band in the gap comes out naturally in the dilute limit of our CPA calculations. (author). 28 refs, 6 figs.

8977 (IC–94/315) **Electrical conductivity study on polythiophenes films.** Youm, I. (International Centre for Theoretical Physics, Trieste (Italy)); Cadene, M.; Laplaze, D. International Centre for Theoretical Physics, Trieste (Italy). Oct 1994. 8p. Order Number DE95614309. Source: OSTI; NTIS (US Sales Only); INIS.

The electrical conduction mechanism of two classes of polythiophenes: polythiophene (PT) and poly(3-methylthiophene) (PMT) films containing various levels of doping counter-ions was investigated. The temperature dependence of electrical conductivity obeys the Mott equation based on variable range hopping. The dimension of the variable range hopping is correlated with the structure of the conducting polymer. It seems for these polymers that carrier transport via mobile conjugational defects does not play a detectable role. (author). 17 refs, 3 figs, 1 tab.

8978 (IC–94/316) **The one-dimensional model of the off-centre potential of the fluorine ion in the NaBr lattice.** Despa, F. International Centre for Theoretical Physics, Trieste (Italy). Oct 1994. 11p. Order Number DE95614310. Source: OSTI; NTIS (US Sales Only); INIS.

Fluorine ions in NaBr have associated large dipole moments with low-lying energy levels. It is well known that the dipoles were found to have equilibrium orientations in the (110) direction. A one-dimensional, double-well harmonic oscillator potential model is assumed for the relaxation rate calculation of this off-centre system. It is possible by superimposing an asymmetric potential which localizes the particle in one potential well and assuming that, the coupling between the particle and the lattice vibrations can lead to the relaxation of the system. These preliminaries theoretical studies are used to determine the height of the potential barrier between the two minima of the off-centre potential in the one-dimensional case approximation. (author). 13 refs.

8979 (IC–94/326) **Multisite antiferromagnetic Ising spin model: Phase transition through doubling bifurcation.** Ananikian, N.S. (Yerevan Physics Inst., Yerevan (Armenia). Dept. of Theoretical Physics); Oganessyan, K.A. International Centre for Theoretical Physics, Trieste (Italy). Oct 1994. 10p. Grant 211-5291-YPI; INTAS-93-633. Order Number DE95614311. Source: OSTI; NTIS (US Sales Only); INIS.

The three-site antiferromagnetic Ising spin model on Husimi tree in external magnetic field is investigated and the line of the second order phase transitions is obtained. The upper bound of the temperature at which period doubling bifurcation and hence second order phase transition appeared is also obtained. (author). 9 refs, 2 figs.

8980 (SAND–94-3070C) **Optical properties of fractal nanocomposites.** Markel, V.A. (Sandia National Labs., Albuquerque, NM (United States)); Kim, W.; Armstrong, R.; Shalaev, V.; Stechel, E.B. Sandia National Labs., Albuquerque, NM (United States). [1994]. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. (CONF-941144–43: 1994 fall meeting of the Materials Research Society (MRS), Boston, MA (United States), 28 Nov - 2 dec 1994). Order Number DE95005414. Source: OSTI; NTIS; INIS; GPO Dep.

Optical prossesses in nanostructured fractal composites are shown to be strongly enhanced. The enhancement occurs because of a localization of dipolar eigenmodes in subwavelength areas.

6651 Nuclear Techniques In Condensed Matter Physics

Refer also to citation(s) 8136, 8145, 8405

8981 (BNL–61083) **FT-IR microscopical analysis with synchrotron radiation: The microscope optics and system performance.** Reffner, J.A. (Spectra-Tech, Inc., Shelton, CT (United States)); Martoglio, P.A.; Williams, G.P. Brookhaven National Lab., Upton, NY (United States). [1995]. 11p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. (CONF-940714–47: International meeting on synchrotron radiation instrumentation, Stony Brook, NY (United States), 18-22 Jul 1994). Order Number DE95004834. Source: OSTI; NTIS; INIS; GPO Dep.

When a Fourier transform infrared (FT-IR) microspectrometer was first interfaced with the National Synchrotron Light Source (NSLS) in September 1993, there was an instant realization that the performance at the diffraction limit had increased 40-100 times. The synchrotron source transformed the IR microspectrometer into a true IR microprobe, providing high-quality IR spectra for probe diameters at the diffraction limit. The combination of IR microspectroscopy and synchrotron radiation provides a powerful new tool for molecular spectroscopy. The ability to perform IR microspectroscopy with synchrotron radiation is still under development at Brookhaven National Laboratory, but several initial studies have been completed that demonstrate the broad-ranging applications of this technology and its potential for materials characterization.

8982 (CONF-9410165–10) **Neutron diffraction from $HoNi_2B_2C$. Version 1.** Tomy, C.V. (Warwick Univ., Coventry (United Kingdom). Dept. of Physics); Chang, L.J.; Paul, D.M.; Andersen, N.H.; Yethiraj, M. Oak Ridge National Lab., TN (United States). 7 Feb 1994. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. From Neutron scattering; Sendai (Japan); 11-14 Oct 1994. Order Number DE95005894. Source: OSTI; NTIS; INIS; GPO Dep.

$RENi_2B_2C$ (RE=Rare Earth) are quaternary compounds which exhibit a considerable degree of interaction between their superconducting and magnetic properties. The Ho variant is found to become superconducting at T_c= 9 K, but anomalous behaviour is observed in the low field magnetic properties at T<7 K (increasing susceptibility with decreasing temperature); at temperatures less than 5.6 K more conventional behaviour is regained. Neutron diffraction measurements demonstrate that at low temperatures (T<5K) the magnetic order consists of ferromagnetic planes antiferromagnetically coupled up the c-axis with a Ho moment of 8.9 ±0 0.2 μ_B canted at 15°±5 from the a-b plane. At high temperatures (7<T<8.5 K) satellites, together with the principal Bragg reflections, are observed which correspond to a modulation of the magnetic order with a wavelength of ~ 136 Å up the c-axis. In the intermediate temperature (5<T<7 K) range further Bragg refections become evident. An additional modulation along the a-axis becomes important in this temperature range.

8983 (IA–1486, pp. 53-54) **Magnetic ordering in $(U_{0.5}Tb_{0.5})Co_2Ge_2$, studies by ac-susceptibility and neutron-diffraction measurements.** Kuznietz, M.; Pinto, H.; Ettedgui, H.; Melamud, M. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993*. 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. URANIUM ALLOYS/magnetic susceptibility; COBALT ALLOYS; COBALT COMPOUNDS; GERMANIUM ALLOYS; INTERMETALLIC COMPOUNDS; MAGNETIC MOMENTS; NEUTRON DIFFRACTION; PARAMAGNETISM; TERBIUM ALLOYS; TERBIUM COMPOUNDS

8984 (INIS-mf–13801, pp. NAT10) **Approximated expression for the dispersion EPR profile.** Jimenez-Dominguez, H. (Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico)); Cabral-Prieto, A. Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico); Instituto de Investigaciones Electricas, Cuernavaca (Mexico); Universidad Autonoma del Estado de Morelos (UAEM), Cuernavaca (Mexico). 1992. 30p. (CONF-9208272–: 9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry, Cuernavaca (Mexico), 16-21 Aug 1992). In

9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry. Abstracts. Order Number DE95611878. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. ELECTRON SPIN RESONANCE/mathematics; MATHEMATICS; EXPERIMENTAL DATA; GAUSS FUNCTION; HILBERT TRANSFORMATION; INTEGRALS; LINE BROADENING; MEASURING INSTRUMENTS; SPECTRA; SPECTROSCOPY

8985 (INIS-mf–14440, pp. 12) **Characterization of superconducting thin films by rutherford backscattering analysis.** Peyrovan, H.; Earwaker, L.G. Iranian Physics Society, Teheran (Iran, Islamic Republic of); Atomic Energy Organization of Iran, Teheran (Iran, Islamic Republic of); Birmingham Univ. (United Kingdom). Aug 1994. 91p. (In English, Persian). (CONF-9408203–: Annual physics conference of Iran, Sanandaj (Iran, Islamic Republic of), 19 Aug - 1 sep 1994). In *Abstracts of annual physics conference of Iran, 1373 Kordestan University.* Order Number DE95611717. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. BARIUM OXIDES/rutherford scattering; BARIUM OXIDES/thin films; COPPER OXIDES/rutherford scattering; COPPER OXIDES/thin films; YTTRIUM OXIDES/rutherford scattering; YTTRIUM OXIDES/thin films; CONCENTRATION RATIO; EPITAXY; ION CHANNELING; MAGNESIUM OXIDES; MONOCRYSTALS; SUBSTRATES; SUPERCONDUCTING FILMS; THICKNESS

8986 (INIS-RU–377, pp. 104) **Measurement of TiN_x stoichiometry by the method of nuclear proton backscattering.** Romanovskij, E.A.; Borisov, A.M.; Goryaga, N.G.; Dang Lamzh Nguen Mak Kha; Smagin, M.N. AN SSSR, Moscow (Russian Federation); Moskovskij Gosudarstvennyj Univ., Moscow (Russian Federation). Nauchno-Issledovatel'skij Inst. Yadernoj Fiziki. 1993. 148p. (In Russian). (CONF-9305364–: 23. International meeting on the physics of charged particle interaction with crystals, Moscow (Russian Federation), 31 May - 2 jun 1993). In *Thesies of the proceedings of the 23. International meeting on the physics of charged particle interaction with crystals.* Order Number DE94631501. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. TITANIUM NITRIDES/chemical composition; TITANIUM NITRIDES/radiation scattering analysis; BACKSCATTERING; BERYLLIUM; MEASURING METHODS; MOLYBDENUM; PROTECTIVE COATINGS; PROTON SPECTRA; PROTONS; SPRAYED COATINGS; STEEL-CR18NI10TI; SUBSTRATES; TANTALUM; THICKNESS; VAPOR DEPOSITED COATINGS

8987 (JINR-E–3-94-291) **Investigation of Fe_3O_4 Colloid Behaviour in a Magnetic Field by Polarized Neutron Transmission.** Dokukin, E.B.; Kozhevnikov, S.V.; Nikitenko, Yu.V.; Petrenko, A.V. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Neutron Physics. 1994. 3p. Order Number DE95614351. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to International Conference on Magnetism-94, Warsaw, Poland, Aug 1994.

Experiments were conducted to measure the dependence of neutron polarization following their transmission through a magnetic colloid on the concentration of magnetic particles, magnetic field strength and wavelength of neutrons. In a magnetic field up to 500 Oe the precession of the neutron polarization is seen. Comparison of the experimental data and theory is made and colloid magnetization is determined. The measurement was carried out with the SPN-1 polarized neutron spectrometer at the high-flux pulsed reactor IBR-2 in Dubna. 7 refs., 2 figs.

8988 (KAERI/RR–1329/94) **Development of ultrasensitive spectroscopic analysis technology -Development of atomic spectroscopy technology-.** Cha, Hyung Ki (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Song, Ky Seok; Rhee, Young Joo; Baik, Dae Hyun; Shin, Jang Soo; Kim, Duck Hyun; Yang, Ki Ho; Yi, Jong Hoon. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jul 1994. 235p. (In Korean). Order Number DE95614352. Source: OSTI; NTIS; INIS.

In this project, three principal techniques are developed. The laser photoionization spectrometry (LAPIS) is used for the ultrasensitive detection for heavy metals such as Pb and Cd. The Laser atomic fluorescence spectrometry is applied to the quantitative analysis of the lanthanide and actinide elements. And the DIAL remote sensing system is used for monitoring the ozone concentration and the atmospheric pollution. A time-of-flight mass spectrometer and a high efficient atomic beam generator were designed and manufactured. Various spectroscopic parameters and optimum analytical condition were investigated. By using the laser fluorescence technique, U, Eu and Sm in solution were quantitatively analyzed. The basic researches for the direct analytical method of solid samples were also carried out. The DIAL system for ozone remote sensing was developed and ozone concentration above Taejon were obtained. (Author).

8989 (RISO-R–748(EN)) **X-ray and neutron scattering from amorphous diamondlike carbon and hydrocarbon films.** Findeisen, E. Risoe National Lab., Roskilde (Denmark). Solid State Physics Dept. Oct 1994. 100p. Order Number DE95616726. Source: OSTI; NTIS; INIS.

In this report amorphous, diamondlike, carbon and hydrocarbon films are investigated by two different methods, namely, X-ray scattering and a combination of X-ray and neutron reflectivity. As specular reflectivity probes the scattering length density profile of a sample perpendicular to its surface, the combination of X-ray and neutron reflectivity reveals the nuclei density of both carbon and hydrogen separately. This allows to calculate the concentration of hydrogen in the films, which varies in the presented experiments between 0 and 36 atomic %. This method is a new and nondestructive technique to determine the concentration of hydrogen within an error of about ± 1 at. % in samples with sharp interfaces. It is well suited for thin diamondlike carbon films. X-ray scattering is used to obtain structural information on the atomic scale, especially the average carbon-carbon distance and the average coordination number of the carbon atoms. As grazing incidence diffraction experiments were not successful, free-standing films are used for the scattering experiments with synchrotron light. However, the scattered intensity for large scattering vectors is, in spite of the intense primary beam, very weak, and therefore the accuracy of the obtained structural parameter is not sufficient to prove the diamondlike properties also on the atomic scale. (au) (10 tabs., 76 ills., 102 refs.).

8990 (UM-P–94/44) **Polarisation resonance in X-ray diffraction.** Goodman, P.; Paterson, D.; Matheson, S. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 15p. Order Number DE95616727. Source: OSTI; NTIS (US Sales Only); INIS.

The study of crystal structures by means of dynamic X-ray diffraction has placed a challenge to theoreticians to revise the X-ray diffraction theory based on Maxwell's equation. In this paper the feasibility of using 'polarisation resonance' as a tool in the determination of absolute configuration for asymmetric structures is investigated. Two (left- and right-handed), σ^+ and σ^-, circular polarization states for 3-beam conditions are considered. Moreover, extending interaction into the 3 rd. dimension (normal to the beam) opens the possibility of absolute configuration determination of asymmetric structures in 3 dimensions. The computational scheme used is shown in terms of scattering diagrams. 7 refs., 1 tab., 6 figs.

6652 Solid-State Plasma

Refer also to citation(s) 8698

6653 Interactions Between Beams and Condensed Matter

Refer also to citation(s) 8119, 8132, 8946

8991 (ANL/MSD/PP–83083) **A simple, closed-form expression for the x-ray reflectivity from superlattices with cumulative roughness.** Kelly, D.M. (Univ. of California, San Diego, La Jolla, CA (United States). Physics Dept.); Santa-Maria, J.; Schuller, I.K.; Fullerton, E.E. Argonne National Lab., IL (United States). May 1994. 12p. Sponsored by USDOE, Washington, DC

(United States). DOE Contract W-31109-ENG-38. Order Number DE95004633. Source: OSTI; NTIS; GPO Dep.

The authors present a simple closed-form expression for the reflectivity from a multilayer which includes the effects of absorption, refraction, surface and substrate reflections but neglects dynamical effects. This expression reproduces the exact dynamical calculation except for the regions near the critical angle and for intense Bragg reflections. The expression is generalized to include cumulative interface roughness which follows a $t^{1/2}$ power-law growth.

8992 (CONF-940903–1) **Raman study of damage processes in Si^+-implanted GaAs.** Ivanda, M. (Institut Rudjer Boskovic, Zagreb (Croatia)); Desnica, U.V.; Haynes, T.E.; Hartmann, I.; Kiefer, W. Oak Ridge National Lab., TN (United States). Sep 1994. 5p. Sponsored by USDOE, Washington, DC (United States);Commission of the European Communities, Brussels (Belgium);Ministry of Science and Technology of Croatia (Croatia). DOE Contract AC05-84OR21400. Contract ERBCIPACT 92-2095. From 22. European congress on molecular spectroscopy; Essen (Germany); 11-16 Sep 1994. Order Number DE95005898. Source: OSTI; NTIS; INIS; GPO Dep.

Ion-induced damage in GaAs as a function of ion dose following 100 keV Si^+ implants has been investigated by Raman spectroscopy. A new approach for decomposition of Raman scattering intensity on to the crystalline and amorphous phase components has been used in analysis of Raman spectra. With increasing ion dose the following was observed: (a) the widths of vibrational bands of a-phase significantly increase, while the width of the LO(Γ) phonon band of c-phase remains unchanged; (b) the longitudinal optical phonon band of c-phase completely dissappears, while the transverse optical phonon mode evolves in to a new band of a-phase; (c) the wavenumbers of all vibrational bands of a- and c-phase shift to lower values by $\sim$ 10–15 cm^{-1}. A number of mechanisms possibly accountable for these shifts were analysed and evaluated.

8993 (IA–1486, pp. 71) **Characteristics of secondary electron emission from CsI induced by X rays with energies up to 100 keV.** Giberkhteerman, A.; Akkerman, A.; Breskin, B.; Chechik, R. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993*. 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. CESIUM IODIDES/secondary emission; CESIUM IODIDES/soft x radiation; ENERGY DEPENDENCE; ENERGY RESOLUTION; ENERGY YIELD; KEV RANGE 10-100; SPECTRA UNFOLDING; THICKNESS

8994 (IC–94/337) **Spectral response of a polycrystalline silicon solar cell.** Ba, B. (International Centre for Theoretical Physics, Trieste (Italy)); Kane, M. International Centre for Theoretical Physics, Trieste (Italy). Oct 1994. 12p. Order Number DE95614370. Source: OSTI; NTIS (US Sales Only); INIS.

A theoretical study of the spectral response of a polycrystalline silicon n-p junction solar cell is presented. The case of a fibrously oriented grain structure, involving grain boundary recombination velocity and grain size effects is discussed. The contribution of the base region on the internal quantum efficiency Q_{int} is computed for different grain sizes and grain boundary recombination velocities in order to examine their influence. Suggestions are also made for the determination of base diffusion length in polycrystalline silicon solar cells using the spectral response method. (author). 15 refs, 4 figs.

8995 (IC–94/342) **Theoretical aspects of electron emission holography.** Fonda, L. (Trieste Univ. (Italy). Ist. di Fisica Teorica). International Centre for Theoretical Physics, Trieste (Italy). Nov 1994. 28p. Order Number DE95614371. Source: OSTI; NTIS (US Sales Only); INIS.

A new surface structure determination approach, called either photoelectron or Auger electron holography depending on the process under consideration, to get three-dimensional images of the close vicinity of a given near-surface atom emitter, has recently been developed. The great advantage of this holographic method lies in the knowledge of the reference wave, a point which is not shared by structure determination approaches using an external beam of particles, such as e.g. x-ray and neutron diffractions, where the reference wave is lost into some direction which is not observed, and the experimenter is therefore faced with the so-called 'phase problem'. 28 refs, 2 figs.

8996 (INIS-RU–377, pp. 77) **Structure changing and impurity behaviour in silicon under phosphorus 'hot' implantation and annealing.** Gajduk, P.I.; Komarov, F.F.; Solov'ev, V.S. AN SSSR, Moscow (Russian Federation); Moskovskij Gosudarstvennyj Univ., Moscow (Russian Federation). Nauchno-Issledovatel'skij Inst. Yadernoj Fiziki. 1993. 148p. (In Russian). (CONF-9305364–: 23. International meeting on the physics of charged particle interaction with crystals, Moscow (Russian Federation), 31 May - 2 jun 1993). In *Thesies of the proceedings of the 23. International meeting on the physics of charged particle interaction with crystals.* Order Number DE94631501. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. SILICON/ion implantation; ANNEALING; DISLOCATIONS; IMPURITIES; KEV RANGE 10-100; ORIENTATION; P-TYPE CONDUCTORS; PHOSPHORUS IONS; POINT DEFECTS; SILICON; SPATIAL DISTRIBUTION; TEMPERATURE DEPENDENCE; TEMPERATURE RANGE 0273-0400 K; THICKNESS

8997 (INIS-RU–377, pp. 78) **Crystal defect kritical concentration under crystal-amorphous state transformation of semiconductor materials.** Novikov, A.P.; Gusakov, G.A. AN SSSR, Moscow (Russian Federation); Moskovskij Gosudarstvennyj Univ., Moscow (Russian Federation). Nauchno-Issledovatel'skij Inst. Yadernoj Fiziki. 1993. 148p. (In Russian). (CONF-9305364–: 23. International meeting on the physics of charged particle interaction with crystals, Moscow (Russian Federation), 31 May - 2 jun 1993). In *Thesies of the proceedings of the 23. International meeting on the physics of charged particle interaction with crystals.* Order Number DE94631501. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. 1 ref. CRYSTAL-PHASE TRANSFORMATIONS/physical radiation effects; AMORPHOUS STATE; CRYSTAL DEFECTS; CRYSTALS; DIAMONDS; SEMICONDUCTOR MATERIALS

8998 (INIS-RU–377, pp. 79) **On the temperature dependence of critical dose of silicon crystal-amorphous state transformation under ion implantation.** Novikov, A.P.; Gusakov, G.A.; Anishchik, V.M. AN SSSR, Moscow (Russian Federation); Moskovskij Gosudarstvennyj Univ., Moscow (Russian Federation). Nauchno-Issledovatel'skij Inst. Yadernoj Fiziki. 1993. 148p. (In Russian). (CONF-9305364–: 23. International meeting on the physics of charged particle interaction with crystals, Moscow (Russian Federation), 31 May - 2 jun 1993). In *Thesies of the proceedings of the 23. International meeting on the physics of charged particle interaction with crystals.* Order Number DE94631501. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. 1 ref. SILICON/crystal-phase transformations; SILICON/ion implantation; AMORPHOUS STATE; ATOMIC DISPLACEMENTS; CRYSTALS; MATHEMATICAL MODELS; MONTE CARLO METHOD; RADIATION DOSES; SILICON; VACANCIES

8999 (INIS-RU–377, pp. 80) **Effect of high energy ions on radiation-induced defects in crystals.** Urmanov, A.R.; Belykh, T.A.; Kazak, L.A.; Prilepo, V.L. AN SSSR, Moscow (Russian Federation); Moskovskij Gosudarstvennyj Univ., Moscow (Russian Federation). Nauchno-Issledovatel'skij Inst. Yadernoj Fiziki. 1993. 148p. (In Russian). (CONF-9305364–: 23. International meeting on the physics of charged particle interaction with crystals, Moscow (Russian Federation), 31 May - 2 jun 1993). In *Thesies of the proceedings of the 23. International meeting on the physics of charged particle interaction with crystals.* Order Number DE94631501. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. 3 refs. CRYSTALS/ion implantation; CRYSTALS/physical radiation effects; BISMUTH; COMPUTERIZED SIMULATION; CRYSTALS; DIFFUSION; GERMANIUM; NICKEL; NITROGEN IONS; SILICON; TITANIUM; TUNGSTEN; VACANCIES

9000 (INIS-RU–377, pp. 81) **Boron-nitrogen interaction in silicon durins a silicon nitrogen structure formation under N^+ ion implantation.** Kachurin, G.A.; Tyschenko, I.E. AN SSSR,

Moscow (Russian Federation); Moskovskij Gosudarstvennyj Univ., Moscow (Russian Federation). Nauchno-Issledovatel'skij Inst. Yadernoj Fiziki. 1993. 148p. (In Russian). (CONF-9305364--: 23. International meeting on the physics of charged particle interaction with crystals, Moscow (Russian Federation), 31 May - 2 jun 1993). In *Thesies of the proceedings of the 23. International meeting on the physics of charged particle interaction with crystals.* Order Number DE94631501. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. SILICON/ion implantation; ANNEALING; BORON ADDITIONS; ELECTRIC CONDUCTIVITY; KEV RANGE 100-1000; NITRIDES; NITROGEN IONS; POINT DEFECTS; RADIATION DOSES; SILICON; TEMPERATURE RANGE 1000-4000 K

9001 (INIS-RU--377, pp. 83) **Study of SiO_2-Si structure implanted by antimony ions.** Bojko, E.B.; Komarov, F.F.; Lyudchik, O.R.; Sokolov, V.N. AN SSSR, Moscow (Russian Federation); Moskovskij Gosudarstvennyj Univ., Moscow (Russian Federation). Nauchno-Issledovatel'skij Inst. Yadernoj Fiziki. 1993. 148p. (In Russian). (CONF-9305364--: 23. International meeting on the physics of charged particle interaction with crystals, Moscow (Russian Federation), 31 May - 2 jun 1993). In *Thesies of the proceedings of the 23. International meeting on the physics of charged particle interaction with crystals.* Order Number DE94631501. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. SILICON/ion implantation; SILICON OXIDES/ion implantation; AMORPHOUS STATE; ANTIMONY IONS; INTERFACES; KEV RANGE 10-100; LAYERS; RADIATION DOSES; SILICON; SUBSTRATES

9002 (INIS-RU--377, pp. 84) **Study of Ta-Si and CoSi systems implanted by boron and antimony ions.** Komarov, F.F.; Lyudchik, O.R.; Sokolov, V.N. AN SSSR, Moscow (Russian Federation); Moskovskij Gosudarstvennyj Univ., Moscow (Russian Federation). Nauchno-Issledovatel'skij Inst. Yadernoj Fiziki. 1993. 148p. (In Russian). (CONF-9305364--: 23. International meeting on the physics of charged particle interaction with crystals, Moscow (Russian Federation), 31 May - 2 jun 1993). In *Thesies of the proceedings of the 23. International meeting on the physics of charged particle interaction with crystals.* Order Number DE94631501. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. ION IMPLANTATION/coatings; ION IMPLANTATION/silicon; ANNEALING; ANTIMONY IONS; COBALT; COATINGS; SILICON; KEV RANGE 10-100; RADIATION DOSES; TANTALUM; TEMPERATURE DEPENDENCE; TEMPERATURE RANGE 1000-4000 K

9003 (INIS-RU--377, pp. 85) **Modification of silicon near surface layer under nitrogen ion implantation.** Petrova, A.G.; Drakin, K.A.; Ignat'ev, A.S. AN SSSR, Moscow (Russian Federation); Moskovskij Gosudarstvennyj Univ., Moscow (Russian Federation). Nauchno-Issledovatel'skij Inst. Yadernoj Fiziki. 1993. 148p. (In Russian). (CONF-9305364--: 23. International meeting on the physics of charged particle interaction with crystals, Moscow (Russian Federation), 31 May - 2 jun 1993). In *Thesies of the proceedings of the 23. International meeting on the physics of charged particle interaction with crystals.* Order Number DE94631501. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. ION IMPLANTATION/silicon; ANNEALING; AUGER EFFECT; CONCENTRATION RATIO; DEPTH; SILICON; KEV RANGE 100-1000; MONOCRYSTALS; NITROGEN IONS; ORIENTATION; SPATIAL DISTRIBUTION; TEMPERATURE RANGE 0400-1000 K; TEMPERATURE RANGE 1000-4000 K

9004 (INIS-RU--377, pp. 87) **Ion volumetric rechanneling in heated crystal under implantation.** Kadmenskij, A.G. AN SSSR, Moscow (Russian Federation); Moskovskij Gosudarstvennyj Univ., Moscow (Russian Federation). Nauchno-Issledovatel'skij Inst. Yadernoj Fiziki. 1993. 148p. (In Russian). (CONF-9305364--: 23. International meeting on the physics of charged particle interaction with crystals, Moscow (Russian Federation), 31 May - 2 jun 1993). In *Thesies of the proceedings of the 23. International meeting on the physics of charged particle interaction with crystals.* Order Number DE94631501. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. 1 ref. ION IMPLANTATION/monocrystals; ION CHANNELING; MONOCRYSTALS; KEV RANGE 10-100; MULTIPLE SCATTERING; POINT DEFECTS; RECOMBINATION; SILICON; THICKNESS

9005 (INIS-RU--377, pp. 93) **Green profile function technique at the description of ion implantation in the case of axis channeling.** Samarin, V.V. AN SSSR, Moscow (Russian Federation); Moskovskij Gosudarstvennyj Univ., Moscow (Russian Federation). Nauchno-Issledovatel'skij Inst. Yadernoj Fiziki. 1993. 148p. (In Russian). (CONF-9305364--: 23. International meeting on the physics of charged particle interaction with crystals, Moscow (Russian Federation), 31 May - 2 jun 1993). In *Thesies of the proceedings of the 23. International meeting on the physics of charged particle interaction with crystals.* Order Number DE94631501. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. 2 refs. ION CHANNELING/orientation; ALUMINIUM IONS; DEPTH; GREEN FUNCTION; ORIENTATION; MEV RANGE 10-100; MONOCRYSTALS; PHOSPHORUS IONS; SILICON; SPATIAL DISTRIBUTION

9006 (INIS-RU--377, pp. 94) **Computerized simulation of rare gas ion implantation in polymer materials.** Grigor'ev, V.V.; Kon'shin, I.V.; Leont'ev, A.V. AN SSSR, Moscow (Russian Federation); Moskovskij Gosudarstvennyj Univ., Moscow (Russian Federation). Nauchno-Issledovatel'skij Inst. Yadernoj Fiziki. 1993. 148p. (In Russian). (CONF-9305364--: 23. International meeting on the physics of charged particle interaction with crystals, Moscow (Russian Federation), 31 May - 2 jun 1993). In *Thesies of the proceedings of the 23. International meeting on the physics of charged particle interaction with crystals.* Order Number DE94631501. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. 3 refs. ION IMPLANTATION/pmma; ARGON IONS; BREMSSTRAHLUNG; COMPUTERIZED SIMULATION; PMMA; KEV RANGE 10-100; KRYPTON IONS; MONTE CARLO METHOD; NEON IONS; XENON IONS

9007 (INIS-RU--377, pp. 97) **Photonuclear transmutation alloying of silicon monocrystals with aluminium.** Maslov, N.I. (and others); Blazhevich, S.V.; Bochek, G.L. AN SSSR, Moscow (Russian Federation); Moskovskij Gosudarstvennyj Univ., Moscow (Russian Federation). Nauchno-Issledovatel'skij Inst. Yadernoj Fiziki. 1993. 148p. (In Russian). (CONF-9305364--: 23. International meeting on the physics of charged particle interaction with crystals, Moscow (Russian Federation), 31 May - 2 jun 1993). In *Thesies of the proceedings of the 23. International meeting on the physics of charged particle interaction with crystals.* Order Number DE94631501. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. 1 ref. SILICON/crystal doping; SILICON/physical radiation effects; ALUMINIUM ADDITIONS; GAMMA RADIATION; MONOCRYSTALS; N-TYPE CONDUCTORS; P-TYPE CONDUCTORS; PHOTONUCLEAR REACTIONS; SILICON; TRANSMUTATION

9008 (INIS-RU--377, pp. 99) **Structural transformations in SnO_2 films bombarded by Kr^+ ions.** Pitirimova, N.A.; Sukhorukov, V.V.; Chigirinskij, Yu.I. AN SSSR, Moscow (Russian Federation); Moskovskij Gosudarstvennyj Univ., Moscow (Russian Federation). Nauchno-Issledovatel'skij Inst. Yadernoj Fiziki. 1993. 148p. (In Russian). (CONF-9305364--: 23. International meeting on the physics of charged particle interaction with crystals, Moscow (Russian Federation), 31 May - 2 jun 1993). In *Thesies of the proceedings of the 23. International meeting on the physics of charged particle interaction with crystals.* Order Number DE94631501. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. TIN OXIDES/ion implantation; AMORPHOUS STATE; CRYSTAL-PHASE TRANSFORMATIONS; CRYSTALS; KEV RANGE 100-1000; KRYPTON IONS; RADIATION DOSES

9009 (JINR-E--14-94-266) **The Neutron Powder Diffraction and Acoustic Investigations of the NH_4SCN Phase Diagram.** Smirnov, L.S. (Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Neutron Physics); Natkaniec, I.; Bragin, S.I.; Solov'ev, A.I.; Brankowski, J.; Goncharova, V.A.; Gromnitskaya, E.L.; Il'ina, G.G.; Stal'gorova, O.V. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Neutron Physics. 1994. 10p.

Order Number DE95614372. Source: OSTI; NTIS (US Sales Only); INIS.

The phase diagram of NH_4SCN was investigated by neutron powder diffraction and acoustic methods, in order to search for a possible triple point and to reveal possible peculiarities near 200 K, observed by other authors, by Raman light scattering. The transition from the monoclinic to the orthorhombic phase was determined on the p-T phase plane in the range of 193-323 K and up to 1.6 GPa by the acoustic method. The temperature dependences of the unit cell parameters and volume and of the transversal wave velocity reveal some anomalies in the monoclinic NH_4SCN phase near 200 K. It is possible that these observed anomalies are due to a freezing of the reorientation processes of NH_4^+ ions. 13 refs., 6 figs.

9010 (JINR-R–1-94-298) **On Optical Transition Radiation of Charged Particles in SiO_2-Aerogels.** Ruzicka, J. (Komenskeho Univ., Bratislava (Slovakia)); Krupa, L.; Fadeev, V.A. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems. 1994. 23p. (In Russian). Order Number DE95614373. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Nuclear Instruments and Methods.

Optical transition radiation (OTR) appearing at a charged particle transition through a series of transparent layers with the parameters close to SiO_2-aerogels is analysed. At low velocities β (β<0,2) it was found out that in this case the whole OTR intensity is much higher in comparison with the radiation of usual width. The rise in the intensity causes optical parametric Vavilov-Cherenkov radiation whose appearance is supported by an assembly radiator, possessing suitable conditions. (author). 10 refs., 16 figs.

9011 (KAERI/RR–1290/93) **Development of industrial ion implantation technology.** Choi, Byung Ho (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Hwang, Churl Kew; Kim, Wan; Jin, Jung Tai; Jung, Ki Sok; Yoon, Su Ho; Shin, Won Churl; Kim, Jong Gook; Han, Jeon Geon; Chung, Ki Hyung. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jan 1994. 265p. (In Korean). Order Number DE95614374. Source: OSTI; NTIS; INIS.

On a cooperation between KAERI, Kurchatov Institute (Russia), and Mirae Co., development of a metal ion implanter and ion implantation technology is performed on a basic idea of popularization and refinement of ion implantation technology applied to the industrial components. The developed implanter is a two beam type: the mass separation line produces several mA of metal ion beams and the non-separation line produces several tens of mA gas ion beams, thus making the synergistic effect possible by the irradiation of beams from both lines. The target is made of a rotating plate of 60cm in radius and can treat various types of industrial components or parts. About 60 kinds of specimens were treated for the development of implantation technology. Two or five times lengthening of longevities were achieved on the PCB drills, razor blades, cutters, and precision dies. (Author).

9012 (LA-UR–94-4179) **Characterization and performance of carbon films deposited by plasma and ion beam based techniques.** Walter, K.C. (and others); Kung, H.; Levine, T. Los Alamos National Lab., NM (United States). [1994]. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-941144–54: 1994 fall meeting of the Materials Research Society (MRS), Boston, MA (United States), 28 Nov - 2 dec 1994). Order Number DE95005213. Source: OSTI; NTIS; GPO Dep.

Plasma and ion beam based techniques have been used to deposit carbon-based films. The ion beam based method, a cathodic arc process, used a magnetically mass analyzed beam and is inherently a line-of-sight process. Two hydrocarbon plasma-based, non-line-of-sight techniques were also used and have the advantage of being capable of coating complicated geometries. The self-bias technique can produce hard carbon films, but is dependent on rf power and the surface area of the target. The pulsed-bias technique can also produce hard carbon films but has the additional advantage of being independent of rf power and target surface area. Tribological results indicated the coefficient of friction is nearly the same for carbon films from each deposition process, but the wear rate of the cathodic arc film was five times less than for the self-bias or pulsed-bias films. Although the cathodic arc film was the hardest, contained the highest fraction of sp^3 bonds and exhibited the lowest wear rate, the cathodic arc film also produced the highest wear on the 440C stainless steel counterface during tribological testing. Thus, for tribological applications requiring low wear rates for both counterfaces, coating one surface with a very hard, wear resistant film may detrimentally affect the tribological behavior of the counterface.

9013 (UM-P–94/34) **Zone axis backscattered electron contrast for fast electrons.** Rossouw, C.J. (CSIRO, Div. of Material Science and Technology, Clayton, Vic (Australia)); Miller, P.R.; Josefsson, T.W.; Allen, L.J. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 25p. Sponsored by Australian Research Council, Canberra, ACT (Australia). Order Number DE95616775. Source: OSTI; NTIS (US Sales Only); INIS.

A dependent Bloch wave theory for inelastic scattering is adapted to predict backscattered electron (BSE) contrast from perfect crystals. This is correlated with 300 keV data from a number of zone axes from spinal, chromia, silicon, aluminium and gallium arsenide. This theory is shown to supersede an independent Bloch wave theory for BSE contrast which is incapable of accounting for asymmetry across polar axes. Orientation dependence of thermal dechanneling of fast electrons is shown to be important. The BSE scattering potential is shown to approximate to a delta function scaled by the atomic number squared on each atom. 25 refs., 1 tab., 9 figs.

9014 (UM-P–94/45) **Polarized Raman spectroscopy of chemically vapour deposited diamond films.** Prawer, S.; Nugent, K.W.; Weiser, P.S. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 11p. Order Number DE95616776. Source: OSTI; NTIS (US Sales Only); INIS.

Polarized micro-Raman spectra of chemically vapour deposited diamond films are presented. It is shown that important parameters often extracted from the Raman spectra such as the ratio of the diamond to non-diamond component of the films and the estimation of the level of residual stress depend on the orientation of the diamond crystallites with respect to the polarization of the incident laser beam. The dependence originates from the fact that the Raman scattering from the non-diamond components in the films is almost completely depolarized whilst the scattering from the diamond components is strongly polarized. The results demonstrate the importance of taking polarization into account when attempting to use Raman spectroscopy in even a semi-quantitative fashion for the assessment of the purity, perfection and stress in CVD diamond films. 8 refs., 1 tab. 2 figs.

9015 (UM-P–94/52) **Structural investigation of xenon ion-beam-irradiated glassy carbon.** McCulloch, D.G. (Monash Univ., Clayton, VIC (Australia). Dept. of Materials Engineering); Prawer, S.; Hoffman, A. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 38p. Sponsored by Australian Research Council, Canberra, ACT (Australia). Order Number DE95616777. Source: OSTI; NTIS (US Sales Only); INIS.

Raman spectroscopy, cross-sectional transmission microscopy and electron energy loss spectroscopy have been used to monitor the ion beam induced transformation in glassy carbon irradiated with 320 keV xenon ions to doses between 5 x 10^12 and 6 x 10^{16} ions/cm^2. It was found that the ion beam amorphizes the glassy carbon structure, the amorphization is accompanied by a compaction of the glassy carbon from an initial density of 1.55 to 2.2 $\pm$ 0.2 g/cm^3 and that approximately 15% of the graphite-like bonds in glassy carbon are converted to diamond-like bonds in the amorphization process. The transformation occurs in two distinct stages as a function of ion dose. For damage levels up to 0.2 dpa the effect of ion beam is to decrease the average graphitic crystallite size. Above 0.2 dpa, disorder in bond length and bond angle away from ideal graphitic threefold coordination occurs leading to complete amorphization at high doses. The amorphization, compaction and presence of approximative 15% sp^3 bonds in the implanted layer of glassy carbon results in surface layer which is significantly more resistant to abrasion than as-grown glassy carbon. 36 refs., 2 tabs., 11 figs.

9016 (UM-P–94/55) **Inelastic plasmon and inter-band electron-scattering potentials for Si from dielectric matrix calculations.** Josefsson, T.W. (Melbourne Univ., Parkville, VIC

(Australia). School of Physics); Smith, A.E. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 24p. Order Number DE95616778. Source: OSTI; NTIS (US Sales Only); INIS.

Inelastic scattering of electrons in a crystalline environment may be represented by a complex non-hermitian potential. Completed generalised expressions for this inelastic electron scattering potential matrix, including virtual inelastic scattering, are derived for outer-shell electron and plasmon excitations. The relationship between these expressions and the general anisotropic dielectric response matrix of the solid is discussed. These generalised expressions necessarily include the off-diagonal terms representing effects due to departure from translational invariance in the interaction. Results are presented for the diagonal back structure dependent inelastic and virtual inelastic scattering potentials for Si, from a calculation of the inverse dielectric matrix in the random phase approximation. Good agreement is found with experiment as a function of incident energies from 10 eV to 100 keV. Anisotropy effects and hence the interaction de localisation represented by the off-diagonal scattering potential terms, are found to be significant below 1 keV. 38 refs., 2 figs.

9017 (UM-P–94/56) **The effect of a non-hermitian crystal potential on the scattering matrix in reflection electron diffraction.** Smith, A.E. (Monash Univ., Clayton, VIC (Australia). Dept. of Physics); Josefsson, T.W. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 13p. Order Number DE95616779. Source: OSTI; NTIS (US Sales Only); INIS.

An extension to include general inelastic scattering effects is developed for the case of reflection electron diffraction scattering from surfaces. In this extension of work by Lynch and Moodie, it is shown how the resultant non-Hermitian matrix problem can be recast in a form that is suitable for computation. In particular, a computational method is outlined based on techniques developed by Eberlein for matrix diagonalisation using complex rotations and shears. The resultant methods are applied to the problem of Convergent Beam RHEED. 23 refs., 3 figs.

9018 (UM-P–94/57) **K-shell ionization under zone axis electron diffraction conditions.** Josefsson, T.W. (Melbourne Univ., Parkville, VIC (Australia). School of Physics); Allen, L.J.; Miller, P.R.; Rossouw, C.J. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 35p. Sponsored by Australian Research Council, Canberra, ACT (Australia). Order Number DE95616780. Source: OSTI; NTIS (US Sales Only); INIS.

A comprehensive theoretical treatment for the inelastic scattering of fast electrons in a crystalline environment is applied to account for variations in characteristic x-ray emission rates from spinel and chromia under zone axis diffraction conditions for 300 keV electrons. X-ray counts as well as backscattered electron contrast are recorded as the beam is tilted by about 70 mrad on a two-dimensional scan raster. Calculated K-shell ionization and backscattering cross sections, based on a model which takes into account interaction delocalization, thermal diffuse scattering and the consequent thickness dependent channelling effects in a realistic way, are in good agreement with experiment. 43 refs., 13 figs.

6654 Quantum Physics Aspects of Condensed Matter

9019 (IC–94/272) **Schwinger-boson studies of the single hole motion in a 2d quantum antiferromagnet.** Wu, C.Q. (International Centre for Theoretical Physics, Trieste (Italy)); Yu, L.; Su, Z.B. International Centre for Theoretical Physics, Trieste (Italy). Sep 1994. 17p. Order Number DE95614444. Source: OSTI; NTIS (US Sales Only); INIS.

Within the Schwinger-boson approach for the t-J model, the single hole problem in a two-dimensional quantum antiferromagnet is studied by using the quantum Bogoliubov-de Gennes formalism which treats the distortion of the spin background and quantum spin fluctuations on an equal footing. Several self-trapped localized hole states are found in the distorted spin-background as in the case of an anisotropic Heisenberg model. These localized hole states survive at finite temperatures when the antiferromagnetic order becomes short-ranged. The energy separation between the two lowest states is reduced by considering the spin-background distortion, but it remains finite. (author). 17 refs, 5 figs, 1 tab.

9020 (IC–94/288) **Effective chiral-spin Hamiltonian for odd-numbered coupled Heisenberg chains.** Subrahmanyam, V. International Centre for Theoretical Physics, Trieste (Italy). Sep 1994. 8p. Order Number DE95614445. Source: OSTI; NTIS (US Sales Only); INIS.

An L x ∞ system of odd number of coupled Heisenberg spin chains is studied using a degenerate perturbation theory, where L is the number of coupled chains. An effective chain Hamiltonian is derived explicitly in terms of two spin half degrees of freedom of a closed chain of L sites, valid in the regime the inter-chain coupling is stronger than the intra-chain coupling. The spin gap has been calculated numerically using the effective Hamiltonian for L = 3,5,7,9 for a finite chain up to ten sites. It is suggested that the ground state of the effective Hamiltonian is correlated, by examining various variational trial states for the effective-spin chain Hamiltonian. (author). 11 refs, 1 fig., 1 tab.

9021 (IC–94/292) **Irreducible Greens' Functions method in the theory of highly correlated systems.** Kuzemsky, A.L. International Centre for Theoretical Physics, Trieste (Italy). Sep 1994. 27p. Order Number DE95614446. Source: OSTI; NTIS (US Sales Only); INIS.

The self-consistent theory of the correlation effects in Highly Correlated Systems (HCS) is presented. The novel Irreducible Green's Function (IGF) method is discussed in detail for the Hubbard model and random Hubbard model. The interpolation solution for the quasiparticle spectrum, which is valid for both the atomic and band limit is obtained. The (IGF) method permits to calculate the quasiparticle spectra of many-particle systems with the complicated spectra and strong interaction in a very natural and compact way. The essence of the method deeply related to the notion of the Generalized Mean Fields (GMF), which determine the elastic scattering corrections. The inelastic scattering corrections leads to the damping of the quasiparticles and are the main topic of the present consideration. The calculation of the damping has been done in a self-consistent way for both limits. For the random Hubbard model the weak coupling case has been considered and the self-energy operator has been calculated using the combination of the IGF method and Coherent Potential Approximation (CPA). The other applications of the method to the s-f model, Anderson model, Heisenberg antiferromagnet, electron-phonon interaction models and quasiparticle tunneling are discussed briefly. (author). 79 refs.

9022 (IC–94/294) **Ferromagnetic Potts model in a magnetic field: Finite lattice extrapolation of the (1+1)-dimensional Hamiltonian.** Bassir, A. (International Centre for Theoretical Physics, Trieste (Italy)); Benyoussef, A. International Centre for Theoretical Physics, Trieste (Italy). Sep 1994. 6p. Order Number DE95614447. Source: OSTI; NTIS (US Sales Only); INIS.

The (1+1)-dimensional Hamiltonian q-state ferromagnetic Potts model in an external magnetic field H is studied using finite lattice extrapolation techniques. The possible phases and their boundaries are determined from the ground state energy and the gap in the excitation energy, for arbitrary values of q and both for positive and negative field. We found that, for H positive, there is a critical value q_c, where a first order transition line appears for $q>q_c$, starting at the zero field transition point and terminating at a critical point in $(h/\lambda, H/\lambda)$ plane, which separates the disordered phase and the ordered phase in the direction of H. For h negative a critical transition line separating the disordered phase and the others (q-1) ordered phases becomes first order for $q>q_c$. (author). 12 refs, 2 figs.

9023 (IC–94/329) **Hamiltonian dynamics of the condensed media with spontaneously broken symmetry.** Kovalevsky, M.Yu. (International Centre for Theoretical Physics, Trieste (Italy)); Isayev, A.A.; Peletminsky, S.V. International Centre for Theoretical Physics, Trieste (Italy). Oct 1994. 35p. Order Number DE95614448. Source: OSTI; NTIS (US Sales Only); INIS.

In this work it is shown how the PB (Poisson Bracket) for different physical systems can be obtained proceeding from transformation that leave invariant the kinematic part of the action. Outside integral terms in the action variation are interpreted as generators of these transformations. Equations for determination of the admitable

variations are found. On the base of developed approach we have considered the classical continuum, the theory of elasticity, hydrodynamics, the number of liquid crystal phases as well as the magnetically ordering and superfluid systems. (author). 18 refs.

9024 (IC–94/340) **Dynamics of an inhomogeneous anisotropic antiferromagnetic spin chain.** Daniel, M. (International Centre for Theoretical Physics, Trieste (Italy)); Amuda, R. International Centre for Theoretical Physics, Trieste (Italy). Nov 1994. 15p. Order Number DE95614449. Source: OSTI; NTIS (US Sales Only); INIS.

We investigate the nonlinear spin excitations in the two sublattice model of a one dimensional classical continuum Heisenberg inhomogeneous antiferromagnetic spin chain. The dynamics of the inhomogeneous chain reduces to that of its homogeneous counterpart when the inhomogeneity assumes a particular form. Apart from the usual twists and pulses, we obtain some planar configurations representing the nonlinear dynamics of spins. (author). 12 refs.

9025 (UM-P–94/89) **Relativistic non-interacting electron gas in a magnetic field.** Glasser, M.L.; Frankel, N.E. Melbourne Univ., Parkville, VIC (Australia). School of Physics. [1994]. 9p. Order Number DE95616903. Source: OSTI; NTIS (US Sales Only); INIS.

The ground state properties of a noninteracting relativistic electron gas are investigated as a function of the strength of a uniform applied magnetic field for two and three dimensions. The calculation of the de Haas-van Alphen terms in the density is also presented. 3 refs.

665410 Superconductivity

Refer also to citation(s) 7826, 7827, 8120, 8268

9026 (ANL/MSD/CP–82573) **Microstructure and composition of a SNS Josephson junction using $CaRuO_3$ as the metallic barrier.** Rozeveld, S. (Argonne National Lab., IL (United States)); Merkle, K.L.; Char, K. Argonne National Lab., IL (United States). Oct 1994. 5p. Sponsored by USDOE, Washington, DC (United States);National Science Foundation, Washington, DC (United States). DOE Contract W-31109-ENG-38. Contract DMR 91-20000. (CONF-941013–21: Applied superconductivity conference, Boston, MA (United States), 16-21 Oct 1994). Order Number DE95004611. Source: OSTI; NTIS; INIS; GPO Dep.

Superconductor - normal - superconductor (SNS) edge junctions consisting of $YBa_2Cu_3O_{7-x}/CaRuO_3/YBa_2Cu_3O_{7-x}$ were fabricated on (001) $LaA1O_3$ substrates. These devices display an excess interface resistance which is not well understood but is related to the SN interface and interlayer structure. High-resolution and conventional transmission electron microscopy were employed to investigate the SN interface to determine the structure and possible interface defects. Energy-loss spectroscopy and energy dispersive x-ray analysis were performed on the $CaRuO_3$ film and near interface regions to quantify the extent of interdiffusion between the $CiRuO_3$ and YBCO films. Changes in either the interface structure or the normal layer chemistry are expected to greatly influence the junction properties.

9027 (ANL/MSD/PP–83268) **Dependence of the Josephson coupling of unconventional superconductors on the properties of the tunneling barrier.** Ledvij, M.; Klemm, R.A. Argonne National Lab., IL (United States). 30 May 1994. 14p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. Order Number DE95004649. Source: OSTI; NTIS; INIS; GPO Dep.

The Josephson coupling between a conventional and an unconventional superconductor is investigated as a function of the properties of the tunneling barrier. A simple model is adopted for the tunneling probability and it is shown that its variation dramatically affects the I_cR_n product of an s-d, as opposed to an s-s junction. Based on these conclusions, experiments are proposed to probe the symmetry of the order parameter in high temperature superconductors.

9028 (CNIC–00779) **The effects of H^+ implants on $YBa_2Cu_3O_7$ superconducting materials.** Luo Chenglin (Nanjing Normal Univ., JS (China)); Pan Guoqiang; Han Ming; Wang Guanghou. China Nuclear Information Centre, Beijing, BJ (China). Sep 1993. 13p. (In Chinese). (NNU–0001.). Order Number DE95614466. Source: OSTI; NTIS (US Sales Only); INIS.

The variations of microstructure and electrical properties of Y-Ba-Cu_O with and without H^+ implantation have been studied by scanning electron microscope, X-ray diffraction and IR spectrum techniques. The results have shown that these variations are directly relative to the intrinsic quality of $YBa_2Cu_3O_7$. Microstructural change is responsible for the variations of electrical properties of $YBa_2Cu_3O_7$ superconductor. The Cu_H bond formed by H^+ implanted into $YBa_2Cu_3O_7$ is not a key factor for these variations.

9029 (CONF-931077–1) **Electronic structure and pairing of strongly correlated fermions: Fermi liquid versus spin liquid.** Byczuk, K. (Warsaw Univ., Warsaw (Poland). Inst. of Theoretical Physics); Karbowski, J.; Spalek, J.; Wojcik, W. Uniwersytet Jagiellonski, Cracow (Poland). Dept. of Physics. Apr 1994. 13p. Sponsored by USDOE, Washington, DC (United States);Polish State Committee for Scientific Research (Poland). DOE Contract FG02-90ER45427. From International conference on superconductivity and strongly correlated electron systems; Amalfi (Italy); 14-16 Oct 1993. Order Number DE95005929. Source: OSTI; NTIS; INIS; GPO Dep.

We summarize recent theoretical results of our group concerning the electronic states of the strongly correlated fermions at nonzero temperature. The state of almost localized fermions is discussed within a mean-field approach for auxiliary bosons, both in the narrow-band (Section 2) and in the hybridized band (Section 3) cases. This state represents a metallic state of correlated fermion systems (such as V_2O_3) below the Mott-Hubbard localization threshold. The Fermi liquid state does not describe properly the properties of narrow band electrons in the large Hubbard – U limit beyond the localization threshold. Therefore, in Section 4 and 5 we introduce a phenomenological concept of statistical spin liquid which describes principal features of a crossover from a high-temperature superconductor to the Mott insulator for a two-dimensional system. It also reproduces the main features of the phase diagram for $La_{2-x}Sr_xCuO_4$ system, which is modelled by a planar structure.

9030 (CONF-9407153–Vol.1) **Superconductivity Program for electric power systems: 1994 annual PEER review. Volume 1, Meeting proceedings.** USDOE Assistant Secretary for Energy Efficiency and Renewable Energy, Washington, DC (United States). 29 Jul 1994. 690p. Sponsored by USDOE, Washington, DC (United States). From Superconductivity program for electric power systems; Alexandria, VA (United States); 19-20 Jul 1994. Order Number DE95005058. Source: OSTI; NTIS; GPO Dep.

This is Volume I of information presented at the Annual Peer Review of the Superconductivity Program For Electric Power Systems. Topics include: Wire development; powder synthesis; characterization of superconducting materials; electric power applications; magnetic refrigerators; and motor cooling issues. Individual reports were processed separately for the database.

9031 (CONF-9407153–Vol.2) **Superconductivity Program for electric power systems: 1994 annual PEER review. Volume 2, Meeting proceedings.** USDOE Assistant Secretary for Energy Efficiency and Renewable Energy, Washington, DC (United States). 29 Jul 1994. 382p. Sponsored by USDOE, Washington, DC (United States). From Superconductivity program for electric power systems; Alexandria, VA (United States); 19-20 Jul 1994. Order Number DE95005059. Source: OSTI; NTIS; GPO Dep.

This is volume 2 of information that was presented at the 1994 Annual Peer Review, Superconductivity Program For Electric Power. Topics include component development; characterization of high-T_cSuperconductors; wire development; coils; magnetic refrigerators; motor cooling issues; and magnetic separation. Individual projects were processed separately for the database.

9032 (ETDE/CH-mf–95743547) **High-temperature superconductivity in Switzerland. Perspectives to the year 2000.** Blatter, J.; Fluekiger, R.; Keller, H.; Lerch, P.; Paul, W.; Rossel, C.; Schueler, C. No corporate text available. 1994. 47p. (In German). Order Number DE95743547. Source: OSTI; NTIS.

In this brochure an interim report on the Swiss National Research Programme "High-temperature Superconductivity" NFP 30 is given. figs., tabs.

9033 (FRCEA-TH–424) **Current distributions in superconducting wires subject to a random orientation magnetic field, and corresponding to the Tokamak usual conditions.** Artaud, J.F. Association Euratom-CEA, Centre d'Etudes de Cadarache, 13 - Saint-Paul-lez-Durance (France). Dept. de Recherches sur la Fusion Controlee; Aix-Marseille-1 Univ., 13 - Marseille (France). Jan 1994. 296p. (In French). Order Number DE95614467. Source: OSTI; NTIS (US Sales Only); INIS.

The main themes of this thesis are: review of superconductivity principles; critical current in a random orientation magnetic field; the MHD model applied to superconductors (with comprehensive calculation of the field in a plate type conductor); the magnetization created by a variation of a random orientation magnetic field; the electric field in a superconductor in steady or quasi-steady state (MHD displacement, pinning and thermal effects). 145 figs., 166 refs.

9034 (IC–94/291) **A simple model for the dc flux transformer in layered superconductors with Josephson coupling.** Uprety, K.K. (International Centre for Theoretical Physics, Trieste (Italy)); Dominguez, D. International Centre for Theoretical Physics, Trieste (Italy). Sep 1994. 30p. Order Number DE95614468. Source: OSTI; NTIS (US Sales Only); INIS.

We present a model for the dc flux transformer configuration in layered superconductors with Josephson coupling. It consists of a simple extension of a model introduced by Clem for the traditional dc flux transformer, but including Josephson coupling and dissipation between planes. We calculate the non-linear current-voltage characteristics for different cases. We find two kinds of behaviour. For weak pinning or strong interplane coupling (both due to magnetic forces and Josephson effect) there is an onset of dissipation with the same voltages in both the top and the bottom faces of the sample, at a given critical current. At a higher current there is a decoupling of the two faces where they have different voltages. This corresponds to a cutting of the vortices that occurs between the first (top) and the second planes. The decoupling current is independent of pinning and vanishes linearly with temperature close to T_c. For strong pinning or weak interplane coupling, each face behaves independently with corresponding different critical currents for the onset of dissipation and different voltages. (author). 22 refs, 5 figs.

9035 (IC–94/297) **On the theory of hole propagation in an antiferromagnetic background.** Kuzemsky, A.L. International Centre for Theoretical Physics, Trieste (Italy). Oct 1994. 15p. Order Number DE95614469. Source: OSTI; NTIS (US Sales Only); INIS.

The spectrum of hole quasiparticles and the role of magnetic correlations has been considered in the self-consistent Irreducible Green Functions formalism, motivated from Strongly Correlated Electron systems for correlated electron models of high-Tc superconductivity. The hole quasiparticle dynamics has been discussed for t-J model and compared with that of the spin-fermion model. For this Kondo-Heisenberg-type model it was clearly pointed out on the self-energy level, beyond Hartree-Fock approximation, how the one-and two magnon processes define the true nature of carriers in HTSC. (author). 57 refs.

9036 (INIS-mf–14440, pp. 10) **Screening currents in anyon superconductivity on the torus for two geometries of fixed external magnetic fields.** Babaei, A.A.; Farajeyan, A.A. Iranian Physics Society, Teheran (Iran, Islamic Republic of); Isfahan Univ. of Technology (Iran, Islamic Republic of). Dept. of Physics. Aug 1994. 91p. (In English, Persian). (CONF-9408203–: Annual physics conference of Iran, Sanandaj (Iran, Islamic Republic of), 19 Aug - 1 sep 1994). In *Abstracts of annual physics conference of Iran, 1373 Kordestan University.* Order Number DE95611717. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. ANYONS/meissner-ochsenfeld effect; ANYONS/superconductivity; ANYONS; SUPERCONDUCTIVITY; CHARGE CARRIERS; MAGNETIC FIELDS; PENETRATION DEPTH; TOROIDAL CONFIGURATION

9037 (INIS-mf–14440, pp. 11) **Investigation of the magnetic flux vortices structure in high-temperature superconductors.** Babaei, A.A.; Kargar, A. Iranian Physics Society, Teheran (Iran, Islamic Republic of); Isfahan Univ. of Technology (Iran, Islamic Republic of). Dept. of Physics. Aug 1994. 91p. (In English, Persian). (CONF-9408203–: Annual physics conference of Iran, Sanandaj (Iran, Islamic Republic of), 19 Aug - 1 sep 1994). In *Abstracts of annual physics conference of Iran, 1373 Kordestan University.* Order Number DE95611717. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. HIGH-TC SUPERCONDUCTORS/ magnetic flux; FREE ENERGY; GINZBURG-LANDAU THEORY; MAGNETIZATION

9038 (KAERI/RR–1327/94) **Development of superconductor application technology -Advanced nuclear materials development-.** Hong, Gyee Won (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Won, Dong Yeon; Lee, Hui Gyun; Lee, Ho Jin; Kim, Chan Joong; Park, Soon Dong; Kim, Uh Kon; Kim, Ki Baek; Kwon, Seon Chil; Kim, Yeon Soo; Lim, Dae Ho; Kim, Jong Jin. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jun 1994. 218p. (In Korean). Order Number DE95614478. Source: OSTI; NTIS; INIS.

Formation of oxide superconducting phase, fabrication of superconducting wire, design and fabrication of precise superconducting magnet were studied for developing superconductor application technique. The CeO_2 addition reduced the particle size of Y_2BaCuO_5 trapped in the matrix after the melt-texture growth. The anomally is not observed at low temperature, which indicates that the oxygen deficiency is not effective flux pinning site at these temperature. Powder-in-powder method was developed to make superconducting wire. The stacking method for bonding the high Tc superconducting tapes was developed and proto-type current lead was fabricated by this technique. The precise superconducting coil was designed and fabricated. The required 4.02tesla was obtained on 139 A. The field deviation along the z axis of 5 cm was below 10 ppm when using 4 terms of shim cols. (Author).

665430 Other Topics in Quantum Fluids and Solids

9039 (IC–94/304) **Properties of a multichannel resonant-level model.** Zhang Yumei (Tongji Univ., Shanghai (China). Pohl Inst. of Solid State Physics); Chen Hong; Wu Xiang. International Centre for Theoretical Physics, Trieste (Italy). Oct 1994. 7p. Order Number DE95614482. Source: OSTI; NTIS (US Sales Only); INIS.

By use of Tomonaga-Luttinger bosonization we find that a multichannel resonant-level model can be transformed into a single-channel Kondo model with antiferro- or ferromagnetic interaction depending on the parameter γ given in terms of the phase shifts. The specific heat and the dynamics of the local impurity have been studied which show a Fermi-liquid vs non-Fermi-liquid transition at $\gamma_c = 1$. (author). 19 refs.

9040 (IC–94/334) **The quantum interference effect in semiconductor space charge layers studied by Feynman path integrals. General formalism and illustrative examples.** Nachev, I. International Centre for Theoretical Physics, Trieste (Italy). Oct 1994. 20p. Order Number DE95614483. Source: OSTI; NTIS (US Sales Only); INIS.

The subband energy states in low-dimensional structures, quantum wells and heterostructures are computed by a new method, which accounts directly the quantum interference effect. It is base on the sum of Feynman paths in real space and time. The heard of this method is a special procedure, which sums a huge number of Feynman paths - of order of 10^{663}, as shown in one of the presented examples. The method has wider applicability range compared to the conventional techniques based on the Schroedinger equation, and can be applied for modelling of the following two cases: (i) resonant tunneling structures or space charge layers in which one discrete energy level interacts with quasicontinuum of states, (ii) compounds with negative energy gaps. Several illustrative examples are given and possible modifications and applications to other problems are outlined. (author). 26 refs, 6 figs.

70 PLASMA PHYSICS AND FUSION

7003 Plasma Physics and Fusion Research

Refer also to citation(s) 9175

9041 (BUDKERINP–93-96) **On the paraxial equilibrium of the finite β plasma in open magnetic configurations.** Lanskij, I.M. AN SSSR, Novosibirsk (Russian Federation). Inst. Yadernoj Fiziki. 1993. 8p. (IYaF–93-96.). Order Number DE95614170. Source: OSTI; NTIS (US Sales Only); INIS.

Paraxial equilibrium of the finite β plasma in the magnetic mirror is considered. The upper β limit is established, upwards of which a current layer is generated in plasma, and, as a consequence, a small longitudinal scale-length occurs in the problem. The latter leads to the violation of the paraxial equilibrium. Results are applicable to various plasma configurations with the mirror confinement. 5 refs., 2 figs.

9042 (BUDKERINP–94-1) **Radial electric field measurement in a tokamak by the injection of a pulsed neutral beam.** Davydenko, V.I. (AN SSSR, Novosibirsk (Russian Federation). Inst. Fiziko-Khimicheskikh Osnov Pererabotki Mineral'nogo Syr'ya); Ivanov, A.A.; Karpushov, A.N.; Ryutov, D.D.; Pozzoli, R.; Rome, M. AN SSSR, Novosibirsk (Russian Federation). Inst. Yadernoj Fiziki. 1994. 22p. (IYaF–94-1.). Order Number DE95614176. Source: OSTI; NTIS (US Sales Only); INIS.

The detection of the profile of the radial electric field of a tokamak by the perpendicular injection of a pulsed neutral beam into the plasma is analyzed. The method is based on the measurement of the toroidal precession velocity of the thus formed ion population. The toroidal drift is caused by the curvature of the magnetic field lines and by the electric field. For the separation of these two effects, the use of a beam with two energy fractions is studied. The application of this diagnostic scheme in a real tokamak is considered. 34 refs., 6 figs., 4 tabs.

9043 (CNIC–00784) **Study of impurity concentrations by VUV spectroscopy on HL-1.** Luo Cuixian (Southwest Inst. of Physics, Leshan, SC (China)); Li Kehua; Liu Yushan; Wang Quanming; Yuan Wenlin. China Nuclear Information Centre, Beijing, BJ (China). Jul 1993. 10p. (SIP–0066.). Order Number DE95614186. Source: OSTI; NTIS (US Sales Only); INIS.

The impurity concentrations in HL-1 were determined by VUV spectroscopy. The absolute calibration of VUV spectrometer by the branching ratio technique and a SITCODE impurity transport code developed in SWIP for interpreting the spectroscopic measurements are described. In order to obtain these results easily on a shot-to-shot basis at the end of each discharge, a simplified fast evaluation method is introduced. The evaluation of the impurity concentrations in HL-1 discharges with and without carbonization, pump limiter and edge polarization are discussed.

9044 (DOE/ER/53198–253) **Transport reduction by current profile control in the reversed field pinch.** Sarff, J.S. (Wisconsin Univ., Madison, WI (United States). Dept. of Physics); Almagri, A.F.; Cekic, M. Wisconsin Univ., Madison, WI (United States). Plasma Physics Research. Nov 1994. 28p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-85ER53198. Order Number DE95007016. Source: OSTI; NTIS; INIS; GPO Dep.

An auxiliary poloidal inductive electric field applied to a reversed field pinch (RFP) plasma reduces the current density gradient, slows the growth of m = 1 tearing fluctuations, suppresses their associated sawteeth, and doubles the energy confinement time. This experiment attacks the dominant RFP plasma loss mechanism of parallel streaming in a stochastic magnetic field. The auxiliary electric field flattens the current profile and reduces the magnetic fluctuation level. Since a toroidal flux change linking the plasma is required to generate the inductive poloidal electric field, the current drive is transient to avoid excessive perturbation of the equilibrium. To sustain and enhance the improved state, electrostatic and RF current drivers are being developed. A novel electrostatic current drive scheme uses a plasma source for electron injection, and the lower-hybrid wave is a good candidate for RF current drive.

9045 (DOE/ER/53198–254) **Advances and prospects in reversed field pinch research.** Prager, S.C. (Wisconsin Univ., Madison, WI (United States). Dept. of Physics). Wisconsin Univ., Madison, WI (United States). Plasma Physics Research. Dec 1994. 6p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-85ER53198. (CONF-941182–1: 6. international Toki conference on plasma physics and controlled nuclear fusion: Research for advanced concepts in magnetic fusion, Toki-city (Japan), 29 Nov - 2 dec 1994). Order Number DE95007017. Source: OSTI; NTIS; INIS; GPO Dep.

The reactor attributes of the compact, high beta RFP are as needed today as when the RFP was conceived. Confinement is a dominant scientific issue at present, In the past several years magnetic fluctuations have been shown experimentally to drive anomalous transport. From an understanding of the cause of transport, it is expected that flattening of the current density profile should suppress fluctuations and transport. Inductive current profile control has succeeded in reducing fluctuations, and doubling the energy and particle confinement times. For steady state current profile control, electrostatic current injection (dc helicity injection) is under preparation and rf current drive (fast wave and lower hybrid) has been shown to be feasible.

9046 (DOE/ER/53212–255) **MHD simulations of DC helicity injection for current drive in tokamaks.** Sovinec, C.R.; Prager, S.C. Wisconsin Univ., Madison, WI (United States). Dept. of Physics. Dec 1994. 28p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-85ER53212. Order Number DE95007018. Source: OSTI; NTIS; INIS; GPO Dep.

MHD computations of DC helicity injection in tokamak-like configurations show current drive with no "loop voltage" in a resistive, pressureless plasma. The self-consistently generated current profiles are unstable to resistive modes that partially relax the profile through the MHD dynamo mechanism. The current driven by the fluctuations leads to closed contours of average poloidal flux. However, the 1% fluctuation level is large enough to produce a region of stochastic magnetic field. A limited Lundquist number (S) scan from 2.5×10^3 to 4×10^4 indicates that both the fluctuation level and relaxation increase with S.

9047 (FRCEA-TH–396) **Study of the dynamics of the lower hybrid wave during current drive in tokamaks and of the Weyl-Wigner in quantum mechanics.** Bizarro, J.P. Association Euratom-CEA, Centre d'Etudes de Cadarache, 13 - Saint-Paul-lez-Durance (France). Dept. de Recherches sur la Fusion Controlee; Aix-Marseille-1 Univ., 13 - Marseille (France). Oct 1993. 82p. (In French). Order Number DE95614229. Source: OSTI; NTIS (US Sales Only); INIS.

A comprehensive and detailed investigation is presented on the dynamics of the lower hybrid wave during current drive in tokamaks in situations where toroidally induced ray stochasticity is important and on the Weyl-Wigner formalism for rotation angle and angular momentum variables in quantum mechanics. It is shown that ray-tracing and Fokker-Planck codes are reliable tools for modelling the physics of lower-hybrid current drive provided a large number of rays is used when stochastic effects are important, and, in particular, that such codes are capable of reproducing the experimentally observed features of the hard X-ray emission. The balance between the wave damping and the stochastic divergence of nearby ray trajectories appears to be of great importance in governing the dynamics of the launched power spectrum and in establishing the characteristics of the deposition patterns. The implications of rotational periodicity and of angular momentum quantization for the Weyl-Wigner formalism are analyzed. Particular attention is paid to discreteness and its consequences: importance of evenness and oddness, use of two difference operators instead of one differential operator. 24 refs.

9048 (GA-A–21834) **Experimental constraints on transport.** Luce, T.C.; Petty, K.H.; Burrell, K.H.; Forest, C.B.; Gohil, P.; Groebner, R.J.; De Haas, J.C.M.; James, R.A.; Makowski, M.A. General Atomics, San Diego, CA (United States). Dec 1994. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-89ER51114. (CONF-940933–24: 15. international

conference on plasma physics and controlled nuclear fusion research, Seville (Spain), 26 Sep - 1 oct 1994). Order Number DE95004962. Source: OSTI; NTIS; INIS; GPO Dep.

Characterization of the cross-field energy transport in magnetic confinement experiments in a manner applicable to the accurate assessment of future machine performance continues to be a challenging goal. Experimental results from the DIII-D tokamak in the areas of dimensionless scaling and non-diffusive transport represent progress toward this goal. Dimensionless scaling shows how beneficial the increase in machine size and magnetic field is for future devices. The experiments on DIII-D are the first to determine separately the electron and ion scaling with normalized gyroradius ρ_*; the electrons scale as expected from gyro-Bohm class theories, while the ions scale consistent with the Goldston empirical scaling. This result predicts an increase in transport relative to Bohm diffusion as ρ_* decreases in future devices. The existence of distinct ρ_* scalings for ions and electrons cautions against a physical interpretation of one-fluid or global analysis. The second class of experiments reported here are the first to demonstrate the existence of non-diffusive energy transport. Electron cyclotron heating was applied at the half radius; the electron temperature profile remains substantially peaked. Power balance analysis indicates that heat must flow in the direction of increasing temperature, which is inconsistent with purely diffusive transport. The dynamics of electron temperature perturbations indicate the presence in the heat flux of a term dependent on temperature rather than its gradient. These two observations strongly constrain the types of models which can be applied to cross-field heat transport.

9049 (GA-A–21872) **Evidence for modified transport due to sheared E x B flows in high-temperature plasmas.** Groebner, R.J. (General Atomics, San Diego, CA (United States)); Burrell, K.H.; Austin, M.E. General Atomics, San Diego, CA (United States); Oak Ridge National Lab., TN (United States); Sandia National Labs., Albuquerque, NM (United States); California Univ., Los Angeles, CA (United States); Massachusetts Inst. of Tech., Cambridge, MA (United States). Plasma Fusion Center; Lawrence Livermore National Lab., CA (United States); California Univ., Los Angeles, CA (United States). Dept. of Physics. Nov 1994. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-89ER51114 ; AC05-84OR21400 ; AC04-76DP00789 ; FG03-86ER53225 ; FG02-91ER54109 ; W-7405-ENG-48 ; FG03-89ER5112 (CONF-9410249–2: International conference on plasma physics, Foz do Igacu (Brazil), 31 Oct - 4 nov 1994). Order Number DE95004870. Source: OSTI; NTIS; INIS; GPO Dep.

Sheared mass flows are generated in many fluids and are often important for the dynamics of instabilities in these fluids. Similarly, large values of the E x B velocity have been observed in magnetic confinement machines and there is theoretical and experimental evidence that sufficiently large shear in this velocity may stabilize important instabilities. Two examples of this phenomenon have been observed in the DIII-D tokamak. In the first example, sufficient heating power can lead to the L-H transition, a rapid improvement in confinement in the boundary layer of the plasma. For discharges with heating power close to the threshold required to get the transition, changes in the edge radial electric field are observed to occur prior to the transition itself. In the second example, certain classes of discharges with toroidal momentum input from neutral beam injection exhibit a further improvement of confinement in the plasma core leading to a regime called the VH-mode. In both examples, the region of improved confinement is characterized by an increase of shear in the radial electric field E_r, reduced levels of turbulence and increases in gradients of temperatures and densities. These observations are consistent with the hypothesis that the improved confinement is caused by an increase in shear of the E x B velocity which leads to a reduction of turbulence. For the VH-mode, the dominant term controlling E_r is the toroidal rotation v_ϕ, indicating that the E_r profile is controlled by the source and transport of toroidal momentum.

9050 (INIS-mf–14440, pp. 6) **A new concept to increase muon cycle rate in muon catalyzed fusion.** Eskandari, M.R. Iranian Physics Society, Teheran (Iran, Islamic Republic of); Shiraz Univ. (Iran, Islamic Republic of). Aug 1994. 91p. (In English, Persian). (CONF-9408203–: Annual physics conference of Iran, Sanandaj (Iran, Islamic Republic of), 19 Aug - 1 sep 1994). In *Abstracts of annual physics conference of Iran, 1373 Kordestan University.* Order Number DE95611717. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. MUON-CATALYZED FUSION; DEUTERIUM; FUSION YIELD; HYDROGEN; TRITIUM

9051 (INIS-mf–14440, pp. 9) **Analysis of relativistic free electron wave generator by plasma electrodynamics.** Maraghechi, B. Iranian Physics Society, Teheran (Iran, Islamic Republic of); Amir Kabir Technical Univ., Teheran (Iran, Islamic Republic of). Dept. of Physics. Aug 1994. 91p. (In English, Persian). (CONF-9408203–: Annual physics conference of Iran, Sanandaj (Iran, Islamic Republic of), 19 Aug - 1 sep 1994). In *Abstracts of annual physics conference of Iran, 1373 Kordestan University.* Order Number DE95611717. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. PLASMA/electrodynamics; BEAM BUNCHING; COHERENT RADIATION; FREE ELECTRON LASERS; MAGNETIC FIELDS; NONLINEAR PROBLEMS; PLASMA; ELECTRODYNAMICS; PONDEROMOTIVE FORCE; WAVEGUIDES

9052 (INIS-mf–14448) **Data acquisition system for a deuteration chamber.** Monroy A, L. Instituto Tecnologico, Toluca (Mexico). 1994. 90p. (In Spanish). Order Number DE95616231. Source: OSTI; NTIS (US Sales Only); INIS.

The work present is focusing auxiliary in the experiment the reaction of fusion in cold in the laboratory of Physical of Plasmas of Instituto Nacional de Investigaciones Nucleares. These systems of acquisition of data concrete to register in line surface of pressure and temperature in the gap of 5.6×10^{-4} to 1×10^{3} and -270 to 1300 Centigrade degrees with help of personal computer. The manner of purchase in chamber of Deuterium is per middle of thermocouple with the object of whereas any control of the temperature in different point in the some of manner the signal of in for the system is the thermocouple (milli volts), the conversion analogy a digital is mean of Cad of 12 bits rate double slope the out is mean the PPI to send the signal to P C of these manner the read of the thermocouples is translate graphic or digital in the screen of the P C. In the phase of pressure element sensor is measure type Pirani, the measure is of manner of temperature. (Author).

9053 (INIS-mf–14453) **Power oscillator in the Tokamaks training.** Valencia A, R. Instituto Politecnico Nacional, Mexico City (Mexico). Escuela Superior de Ingenieria Mecanica y Electrica. 1994. 147p. (In Spanish). Order Number DE95616538. Source: OSTI; NTIS (US Sales Only); INIS.

This work reports the results obtained from the cleaning of the Novillo Tokamak Chamber, using an A.F. Taylor Discharge Cleaning (TDC) in H_2 with a power oscillator of 20 k W and 17.5 k Hz. The plasma temperature in the discharge was of one electron-volt ($Te \simeq 1$ eV) with a moderate electron density $n_e \simeq 4 \times 10^{11}$ cm^{-3}. This discharge cleaning was found helpful in the removal of C and O via the formation of pumping compounds such as CH_4 and H_2O. A residual gas analyzer was used to monitor the partial pressure of these and other compounds, indicating removal rates as high as two monolayers/hour at the beginning of the discharge. A value of $Z_{eff} = 3$ was estimated for a discharge of 7 k A after conditioning. (Author).

9054 (IPP–6/322) **Nonlinear instability mechanism in 3-D collisional driftwave turbulence.** Biskamp, D.; Zeiler, A. Max-Planck-Institut fuer Plasmaphysik, Garching (Germany). Aug 1994. 26p. Order Number DE95738334. Source: OSTI; NTIS (US Sales Only); INIS.

Numerical simulations of 3-D collisional drift-wave turbulence reveal a behavior basically different from that found in previous 2-D studies. The linear instability saturates due to energy transfer to small k_z leading to formation of convective cells. The turbulence is sustained by nonlinear transfer processes between $k_z=0$ and $k_z\neq0$ modes, the latter acting as a catalyst. The system tends to relax to a nonturbulent poloidal shear flow. Introducing a damping of this flow gives rise to an intermittent behavior, where laminar periods of zero flux alternate with bursts of turbulence and large flux, the transitions occuring on time scale short compared with the linear growth times. (orig.)

9055 (IYaF–93-44) **Removal of impurity ions from a magnetic trap with a two-component plasma on their collision with fast component ions.** Tsidulko, Yu.A. AN SSSR, Novosibirsk (Russian Federation). Inst. Yadernoj Fiziki. 1993. 21p. (In Russian). Order Number DE95614171. Source: OSTI; NTIS (US Sales Only); INIS.

It is shown that at the sufficient energy and intensity of fast particle injection in a gas-dynamic trap the collisions of the particles with impurity ions prevent storage of the impurity ions, which is connected with availability of potential barriers in the points of fast ion stops. Formulae for the cleaning rate and efficiency are obtained. Results of calculations for a concrete variant of trap parameters are presented. 6 refs., 7 figs.

9056 (IYaF–93-97) **Bernstein-Green-Kruskal wave.** Buchel'nikova, N.S.; Lazeev, B.N. AN SSSR, Novosibirsk (Russian Federation). Inst. Yadernoj Fiziki. 1993. 18p. (In Russian). Order Number DE95614201. Source: OSTI; NTIS (US Sales Only); INIS.

The simulation model (PIC method) of the Bernstein-Green-Kruskal wave (BGK wave) with the trapping region filled by the trapped electrons is described. The parameters of the BGK wave (phase velocity, amplitude, energy, density and velocity distribution) in homogeneous collisionless plasma with the fixed ions are shown to be constant at the time interval $\approx 100_{\omega_e}$. 8 refs., 14 refs.

9057 (IYaF–93-98) **Bernstein-Green-Kruskal wave. 2. The interaction with the Langmuir wave. Stochastic phenomena.** Buchel'nikova, N.S.; Lazeev, B.N. AN SSSR, Novosibirsk (Russian Federation). Inst. Yadernoj Fiziki. 1993. 54p. (In Russian). Order Number DE95614202. Source: OSTI; NTIS (US Sales Only); INIS.

The interaction of the Bernstein-Green-Kruskal (BGK) wave (N=1) with the Langmuir wave was studied in numerical experiments. It was shown that the interaction leads to the stochastic instability (the formation of the stochastic layers) or to the large scale stochasticity. The evolution of the large scale stochasticity is accompanied by the secondary nonlinear effects, which lead to the increase of the amplitude of the BGK and Langmuir waves and to the increase of the Chirikov parameter. The final stage of the large scale stochasticity evolution is the formation of a new quasistationary structure on the phase plane, which includes the region of stochastic motion. It was shown that the BGK wave itself is unstable due to the interaction with the Langmuir waves excited by the electric field of the electron density distribution in the BGK wave, which leads to the stochastic instability or the large scale stochasticity. 4 refs., 22 figs., 9 tabs.

9058 (IYaF–94-33) **Longitudinal losses of charged particles from an open configuration with arbitrary β ratio.** Khudik, V.N. AN SSSR, Novosibirsk (Russian Federation). Inst. Yadernoj Fiziki. 1994. 17p. (In Russian). Order Number DE95614187. Source: OSTI; NTIS (US Sales Only); INIS.

On the base of the Fokker-Planck linearized equation are calculated classical longitudinal losses of charged particles from an open trap with arbitrary mirror ratio. It is shown that at all physically interested mirror ratios the mean energy, taken away by one charge particle from a trap, equals ϵ_0+T where $\epsilon_0=-e\Phi$ (Φ is the ambipolar trapping potential) and T is temperature of charged particles. 7 refs., 1 fig.

9059 (IYaF–94-35) **Determination of electric and magnetic fields in open trap plasmas by means of atomic-molecular beam hydrogen isotopes.** Kabantsev, A.A. AN SSSR, Novosibirsk (Russian Federation). Inst. Yadernoj Fiziki. 1994. 20p. (In Russian). Order Number DE95614177. Source: OSTI; NTIS (US Sales Only); INIS.

This paper describes a method of electric and magnetic fields and their fluctuations simultaneous measurements in open trap plasmas with $\beta < 1$. The method is based on radial injections of 15-60 keV atomic/molecular beam of hydrogen isotopes. The time resolution is expected to be of the order of 1 μs. 13 refs., 2 figs.

9060 (IYaF–94-36) **Calibration of multichannel analyzer of charge-exchange atoms.** Antipin, D.V.; Churkin, I.N. AN SSSR, Novosibirsk (Russian Federation). Inst. Yadernoj Fiziki. 1994. 11p. (In Russian). Order Number DE95614178. Source: OSTI; NTIS (US Sales Only); INIS.

The aim of the paper is calibration of units of a multichannel analyzer of charge-exchange neutrals intended for hot plasma diagnoctics. A dependence is obtained between the microchannel-plate detector output current and fast H^0 current at the analyzer input in the 5-80 keV range. Operation modes of a gas target and the amplification coefficient of the microchannel-plate detector are determined. 9 refs., 9 figs.

9061 (IYaF–94-48) **Conversion of the Bernstein-Green-Kruskal wave on the density perturbation. Part 1.** Buchel'nikova, N.S.; Lazeev, B.N. AN SSSR, Novosibirsk (Russian Federation). Inst. Yadernoj Fiziki. 1994. 25p. (In Russian). Order Number DE95614203. Source: OSTI; NTIS (US Sales Only); INIS.

The interaction of the BGK-wave with sinusoidal density perturbation in the one-dimensional plasma with fixed ions was studied in numerical experiments (PIC-method). It was shown, that this interaction, like the case of the Langmuir wave, leads to the conversion into the direct and backward Langmuir waves with the wave numbers $N=N_e\pm\beta N_i$, β=1,2,3... In the dynamical description the conversion shows itself in the modulation of the electric field and in the localization of the energy in the density cavities. 5 refs., 15 figs., 1 tab.

9062 (IYaF–94-49) **Conversion of the Bernstein-Green-Kruskal wave on the density perturbation. Part 2.** Buchel'nikova, N.S.; Lazeev, B.N. AN SSSR, Novosibirsk (Russian Federation). Inst. Yadernoj Fiziki. 1994. 23p. (In Russian). Order Number DE95614204. Source: OSTI; NTIS (US Sales Only); INIS.

The interaction of BGK-wave with sinusoidal density perturbation in the one-dimensional plasma with fixed ions was studied in numerical experiments (PIC-method). It was shown, that this interaction leads to the conversion into direct and backward Langmuir waves with the wave numbers $N=N_e\pm\beta_i$, β=1,2,3... The evolution of the conversion does not differ practically from the cases with the same n-tilde/n_0, but another λ_i and λ_e/λ_i=3. In all cases the electrons trapped in the BGK-wave stabilize the wave and prevent the conversion. 7 refs., 9 figs., 3 tabs.

9063 (IYaF–94-50) **Conversion of the Bernstein-Green-Kruskal wave on the density perturbation. Part 3.** Buchel'nikova, N.S.; Lazeev, B.N. AN SSSR, Novosibirsk (Russian Federation). Inst. Yadernoj Fiziki. 1994. 32p. (In Russian). Order Number DE95614205. Source: OSTI; NTIS (US Sales Only); INIS.

The interaction of the BGK-wave with sinusoidal density perturbation in the one-dimensional plasma with fixed ions was studied in numerical experiments (PIC-method). The results are compared with works, where the cases with another parameters of the BGK-wave and the density perturbation were studied. It was shown, that this interaction in all the cases leads to the conversion into direct and backward Langmuir waves with the wave numbers $N=N_e\pm\beta N_i$, β=1,2,3... and in the case $N_i=N_e$ into the direct waves $N=N_e\pm\beta N_i$, like the case of the Langmuir wave conversion. But the evolution of the conversion is different. In all the cases the electrons, trapped in the BGK-wave, stabilize the wave and prevent the conversion. 10 refs., 19 figs., 2 tabs.

9064 (IYaF–94-51) **Conversion of the Bernstein-Green-Kruskal wave on the density perturbation. Part 4.** Buchel'nikova, N.S.; Lazeev, B.N. AN SSSR, Novosibirsk (Russian Federation). Inst. Yadernoj Fiziki. 1994. 29p. (In Russian). Order Number DE95614206. Source: OSTI; NTIS (US Sales Only); INIS.

The interaction of the BGK-wave with sinusoidal density perturbation in the one-dimensional plasma with fixed ions was studied in numerical experiments (PIC-method). It was shown that this interaction leads to the conversion into the direct and backward Langmuir waves with the wave numbers $N=N_e\pm\beta N_i$, β=1,2,3... In the cases with n-tilde/n_0 $\approx$0,6 - 0,9 the wide spectrum of the conversion modes is excited up to $\beta \approx 8$ during one plasma period. In these cases the main role plays the large scale stochasticity of the electron motion which shows itself in the region of the crossing trapping regions of the shortwavelength conversiopn modes. The energy of the BGK-wave is transfered through the longwavelength conversion modes into the shortwavelength modes, where it is absorbed by the plasma electrons. As a result the electric field energy is damped and the BGK-wave is destroyed. 8 refs., 18 figs., 1 tab.

9065 (IYaF–94-63) **Optimization of an expander of a gas-dynamic trap.** Kotel'nikov, I.A. AN SSSR, Novosibirsk (Russian Federation). Inst. Yadernoj Fiziki. 1994. 9p. (In Russian). Order Number DE95614172. Source: OSTI; NTIS (US Sales Only); INIS.

A problem of the gas-dynamic trap expander optimization is solved. The equation is obtained for the line of force, providing the maximal safety factor in a trap. 1 ref., 2 figs.

9066 (IYaF–94-66) **HF-stabilization of plasma with sharp boundary.** Kotel'nikov, I.A.; Yakovchenko, S.G. AN SSSR, Novosibirsk (Russian Federation). Inst. Yadernoj Fiziki. 1994. 27p. (In Russian). Order Number DE95614207. Source: OSTI; NTIS (US Sales Only); INIS.

Effect of HF natural oscillations, of a plasma filament in a conducting cylindric housing on the flute disturbance stability is investigated. Flute development leads to HF oscillation frequency ω variation connected with their energy W variation by the condition of constancy of the adiabatic invariant W/ω=const. The last is conserved owing to relative slow variations of flute disturbances. The adiabatic approximation using permits to obtain simple criteria for flute instability stabilization by a HF field. HF oscillations of a plasma with a sharp boundary are considered. 27 refs., 8 figs.

9067 (IYaF–94-67) **Energy spectra of charge-exchange atoms from a rotating plasma.** Volosov, V.I.; Churkin, I.N. AN SSSR, Novosibirsk (Russian Federation). Inst. Yadernoj Fiziki. 1994. 12p. (In Russian). Order Number DE95614179. Source: OSTI; NTIS (US Sales Only); INIS.

For determining the real spectrum of ions in a rotating plasma are considered the problems in the ion spectra for cases with the ion distribution function in velocity in the form of the δ function, a shifted δ function and for an arbitrary ion spectrum. 5 refs., 4 figs.

9068 (KAERI/RR–1365/93) **Development of plasma diagnostics technologies -A study on nuclear fusion reactor-.** Hwang, Churl Kew (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Kim, Seong Kyu; Lee, Kwang Won; In, Sang Ryeol; Choi, Byeong Ho; Hong, Bong Geun; Chung, Seung Ho; Oh, Byeong Hoon; Yoon, Jae Seong; Yoon, Byeong Joo; Song, Woo Seop. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jul 1994. 139p. (In Korean). Order Number DE95614180. Source: OSTI; NTIS; INIS.

Plasma diagnostics systems are studied and designed in detail for tokamak KAERIT. The systems for the electron cyclotron emission (ECE) receiver, the soft X-ray spectroscopy, visible light spectroscopy, static electric probes and data acquisition to process the diagnostic data are planned to develop. Also studied for detail design in the next year are the systems for mm wave interferometry, vacumm-UV light spectroscopy and neutral beam detection. The ECE receiver is designed in single channel at 93 GHz aimming to get high sensitivity. The soft X-ray spectroscopy system consists of a carbon target which emits electrons by X-ray and an energy analyser for the electrons. The electric probe is designed in tripple electrodes and capable of detection in real time mode. (Author).

9069 (KTH-ALF-R–94-2) **Vertical displacement and position control in tokamaks.** Lehnert, B. Royal Inst. of Tech., Stockholm (Sweden). Dept. of Fusion Plasma Physics. Jun 1994. 16p. (TRITA-ALF–94-2.). Order Number DE95614166. Source: OSTI; NTIS; INIS.

Free-boundary nearly rigid displacements are considered in a plasma confined by a magnetic field consisting of one part generated by the plasma current density, and one part being due to steady currents in fixed external conductors. An induced surface current effect and a related force on the plasma arise when the externally applied field is inhomogeneous in the direction of displacement. This additional force has not been taken into account in conventional MHD theory. In the particular case of tokamaks, the induced surface current effect has two impacts on vertical nearly rigid displacements. First, there arises an additional restoring force and a positive contribution to the change in potential energy when the externally applied field is inhomogeneous in the vertical direction. A special design of poloidal field coils can thus provide new means for vertical position control in tokamaks, also in the case of strongly elongated cross-sections. Second, an earlier simplified model, in which the plasma is represented by a line current, has to be modified since the plasma is a highly conducting body of finite size. 4 refs.

9070 (LA-UR–94-4333) **Magnetized target fusion: An ultra high energy approach in an unexplored parameter space.** Lindemuth, I.R. Los Alamos National Lab., NM (United States). [1994]. 25p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9411182–2: 1. international symposium for evaluation of current trends in fusion research, Washington, DC (United States), 14-18 Nov 1994). Order Number DE95005252. Source: OSTI; NTIS; INIS; GPO Dep.

Magnetized target fusion is a concept that may lead to practical fusion applications in a variety of settings. However, the crucial first step is to demonstrate that it works as advertised. Among the possibilities for doing this is an ultrahigh energy approach to magnetized target fusion, one powered by explosive pulsed power generators that have become available for application to thermonuclear fusion research. In a collaborative effort between Los Alamos and the All-Russian Scientific Institute for Experimental Physics (VNIIEF) a very powerful helical generator with explosive power switching has been used to produce an energetic magnetized plasma. Several diagnostics have been fielded to ascertain the properties of this plasma. We are intensively studying the results of the experiments and calculationally analyzing the performance of this experiment.

9071 (LRP–504/94) **Papers presented at the 15. international conference on plasma physics and controlled nuclear fusion research.** Ecole Polytechnique Federale, Lausanne (Switzerland). Centre de Recherche en Physique des Plasma (CRPP). Oct 1994. 26p. (CONF-940933–: 15. international conference on plasma physics and controlled nuclear fusion research, Seville (Spain), 26 Sep - 1 oct 1994). Order Number DE95614173. Source: OSTI; NTIS; INIS.

This report contains two papers presented at the 15. international conference on plasma physics and controlled nuclear fusion research, and one post-deadline paper. figs., tabs., refs.

9072 (LRP–504/94, [pp. 6]) **Variable configuration plasmas in TCV.** Lister, J.B. (Ecole Polytechnique Federale, Lausanne (Switzerland). Centre de Recherche en Physique des Plasma (CRPP)); Hofmann, F.; Anton, M. Ecole Polytechnique Federale, Lausanne (Switzerland). Centre de Recherche en Physique des Plasma (CRPP). Oct 1994. (CONF-940933–: 15. international conference on plasma physics and controlled nuclear fusion research, Seville (Spain), 26 Sep - 1 oct 1994). In *Papers presented at the 15. international conference on plasma physics and controlled nuclear fusion research.* 26p. Order Number DE95614173. Source: OSTI; NTIS; INIS.

During its first year of operation, TCV has achieved a wide variety of plasma shapes, limited and diverted, attaining 810 kA plasma current and elongation over 2.0. Ohmic H-Modes have been regularly produced, with a maximum confinement time of 80 msec and maximum normalised β_N of 1.9. The conditions for the H-Mode transition differ from other experiments. The transitions from ELM-free to ELMy H-Modes and back have been selectively triggered for configurations close to a Double-Null. (author) 3 figs., 5 refs.

9073 (LRP–504/94, [pp. 9]) **Alfven eigenmodes active excitation experiments in JET.** Fasoli, A. (Ecole Polytechnique Federale, Lausanne (Switzerland). Centre de Recherche en Physique des Plasma (CRPP)); Ali-Arshad, S.; Borba, D. Ecole Polytechnique Federale, Lausanne (Switzerland). Centre de Recherche en Physique des Plasma (CRPP). Oct 1994. (CONF-940933–: 15. international conference on plasma physics and controlled nuclear fusion research, Seville (Spain), 26 Sep - 1 oct 1994). In *Papers presented at the 15. international conference on plasma physics and controlled nuclear fusion research.* 26p. Order Number DE95614173. Source: OSTI; NTIS; INIS.

The newly installed JET Alfven Eigenmodes (AE) active diagnostic is described along with the first experimental results. The aim of this diagnostic, which is based on external antenna excitation and synchronous detection of the plasma response, is a systematic study of the AE properties, in particular in terms of damping and stability. Direct information on frequencies, mode structures and, most importantly, damping rates of the excited global resonances can be obtained. TAE modes have been excited and identified by

the dependence of their frequency upon magnetic field and density. The first direct measurements of the AE damping rates in different regimes corresponding to distinct dominant absorption mechanisms are reported. (author) 5 figs., 6 refs.

9074 (LRP–504/94, [pp. 9]) **Wall stabilization of ideal modes in tokamaks.** Ward, D.J. (Ecole Polytechnique Federale, Lausanne (Switzerland). Centre de Recherche en Physique des Plasma (CRPP)); Bondeson, A. Ecole Polytechnique Federale, Lausanne (Switzerland). Centre de Recherche en Physique des Plasma (CRPP). Oct 1994. (CONF-940933–: 15. international conference on plasma physics and controlled nuclear fusion research, Seville (Spain), 26 Sep - 1 oct 1994). In *Papers presented at the 15. international conference on plasma physics and controlled nuclear fusion research.* 26p. Order Number DE95614173. Source: OSTI; NTIS; INIS.

We present two-dimensional stability calculations to show that low-n, pressure driven, external modes in tokamaks can be fully stabilized by resistive walls when the plasma rotates at some fraction of the sound speed. This stabilization can give significant increase in the beta limits imposed by these modes. The stabilization depends on the toroidal coupling of Alfven and sound waves and is affected by ion Landau damping. This stabilizing effect is of particular importance to advanced tokamak configurations that depend on wall stabilization for low-n modes. Stabilization by resistive walls is found to be more effective in cases with more than one resonant surface in the plasma. (author) figs., tabs., refs.

9075 (LRP–509/94) **Intensity dependence of the third harmonic generation efficiency for high power far infrared radiation in n-silicon.** Urban, M. (Ecole Polytechnique Federale, Lausanne (Switzerland). Centre de Recherche en Physique des Plasma (CRPP)); Nieswand, C.; Siegrist, M.R.; Keilmann, F. Ecole Polytechnique Federale, Lausanne (Switzerland). Centre de Recherche en Physique des Plasma (CRPP). Nov 1994. 26p. Order Number DE95614248. Source: OSTI; NTIS; INIS.

The third harmonic generation of far-infrared (FIR) laser radiation in n-doped silicon was measured for the first time with full temporal resolution of the power fluctuations during the FIR laser pulse. Thus the intensity dependence of the nonlinear coefficient $\chi^{(3)}$ could be observed. For 2 MW incident power, corresponding to an intensity of 15 MW/cm^2, at a wavelength of 676 μm a power conversion efficiency of 10^{-3} was reached. (author) 5 figs., 6 refs.

9076 (PPPL–2999) **Active core profile and transport modification by application of Ion Bernstein Wave power in PBX-M.** LeBlanc, B. (Princeton Univ., NJ (United States). Plasma Physics Lab.); Bell, R.; Batha, S. Princeton Univ., NJ (United States). Plasma Physics Lab. Jan 1995. 46p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH03073. Order Number DE95006238. Source: OSTI; NTIS; INIS; GPO Dep.

Application of Ion Bernstein Wave Heating (IBWH) into the Princeton Beta Experiment-Modification (PBX-M) tokamak stabilizes sawtooth oscillations and generates peaked density profiles. A transport barrier, spatially correlated with the IBWH power deposition profile, is observed in the core of IBWH assisted neutral beam injection (NBI) discharges. A precursor to the fully developed barrier is seen in the soft x-ray data during edge localized mode (ELM) activity. Sustained IBWH operation is conducive to a regime where the barrier supports large ∇n_e, ∇T_e, ∇v_{phi}, and ∇T_i, delimiting the confinement zone. This regime is reminiscent of the H(high)-mode but with a confinement zone moved inwards. The core region has better than H-mode confinement while the peripheral region is L(low)-mode-like. The peaked profile enhanced NBI core deposition and increases nuclear reactivity. An increase in central T_i results from χ_i reduction (compared to H-mode) and better beam penetration. Bootstrap current fractions of up to 0.32–0.35 locally and 0.28 overall were obtained when an additional NBI burst is applied to this plasma.

9077 (PPPL–3026) **Transport in gyrokinetic tokamaks.** Mynick, H.E.; Parker, S.E. Princeton Univ., NJ (United States). Plasma Physics Lab. Jan 1995. 45p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH03073. Order Number DE95006236. Source: OSTI; NTIS; INIS; GPO Dep.

A comprehensive study of transport in full-volume gyrokinetic (gk) simulations of ion temperature gradient driven turbulence in core tokamak plasmas is presented. Though this "gyrokinetic tokamak" is much simpler than experimental tokamaks, such simplicity is an asset, because a dependable nonlinear transport theory for such systems should be more attainable. Toward this end, we pursue two related lines of inquiry. (1) We study the scalings of gk tokamaks with respect to important system parameters. In contrast to real machines, the scalings of larger gk systems ($a/\rho_s \gtrsim 64$) with minor radius, with current, and with a/ρ_s are roughly consistent with the approximate theoretical expectations for electrostatic turbulent transport which exist as yet. Smaller systems manifest quite different scalings, which aids in interpreting differing mass-scaling results in other work. (2) With the goal of developing a first-principles theory of gk transport, we use the gk data to infer the underlying transport physics. The data indicate that, of the many modes k present in the simulation, only a modest number ($N_k \sim 10$) of k dominate the transport, and for each, only a handful ($N_p \sim 5$) of couplings to other modes p appear to be significant, implying that the essential transport physics may be described by a far simpler system than would have been expected on the basis of earlier nonlinear theory alone. Part of this analysis is the inference of the coupling coefficients M_{kpq} governing the nonlinear mode interactions, whose measurement from tokamak simulation data is presented here for the first time.

9078 (PPPL–3027) **A linear systems description of the CO_2 laser based tangential imaging system.** Wright, E.L.J.; Nazikian, R. Princeton Univ., NJ (United States). Plasma Physics Lab. Jan 1995. 17p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH03073. Order Number DE95006235. Source: OSTI; NTIS; INIS; GPO Dep.

We demonstrate that the phase variation produced by the projection of the density fluctuations onto a laser beam that is aligned tangent to the magnetic field lines in a toroidal plasma, is in fact a convolution of the density fluctuation profile in the tangency plane with a shift-invariant point spread function. Thus a spatial filter can be used to invert the corresponding transfer function to produce an undistorted image of the plasma density fluctuations at the tangency plane. Numerical simulations demonstrate that a spatial filter consisting of a simple and versatile step-function form of a Zernike phase mirror, will recover a reasonably accurate image of the fluctuations.

9079 (PPPL–3029) **Initial H-mode experiments in DT plasmas on TFTR.** Bush, C.E. (Oak Ridge National Lab., TN (United States)); Sabbagh, S.A.; Bell, R.E. Princeton Univ., NJ (United States). Plasma Physics Lab. Jan 1995. 5p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH03073 ; FG02-89ER53297. (CONF-9406270–1: 21. EPS conference on controlled fusion and plasma physics, Montpellier (France), 27 Jun - 1 jul 1994). Order Number DE95006234. Source: OSTI; NTIS; INIS; GPO Dep.

H-modes have been obtained for the first time in high temperature, high poloidal beta plasmas with significant tritium concentrations in TFTR. Tritium is provided mainly through high power neutral beam injection (NBI) with powers up to 28 MW and beam energies of 90–110 keV. Transition to a circular limiter H-mode has been obtained following a rapid ramp down of the plasma current. Some of the highest values of τ_E have been achieved on TFTR during the ELM-free phase of these DT H-mode plasmas. τ_E enhancements greater than four times L-mode have been achieved.

9080 (PPPL–3030) **Hot-ion Bernstein wave with large $k_{parallel}$.** Ignat, D.W.; Ono, M. Princeton Univ., NJ (United States). Plasma Physics Lab. Jan 1995. 16p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH03073. Order Number DE95006233. Source: OSTI; NTIS; INIS; GPO Dep.

The complex roots of the hot plasma dispersion relation in the ion cyclotron range of frequencies have been surveyed. Progressing from low to high values of perpendicular wave number $k\perp$ we find first the cold plasma fast wave and then the well-known Bernstein wave, which is characterized by large dispersion, or large changes in $k\perp$ for small changes in frequency or magnetic field. At still higher $k\perp$ there can be two hot plasma waves with relatively little dispersion. The latter waves exist only for relatively large $k||$,

the wave number parallel to the magnetic field, and are strongly damped unless the electron temperature is low compared to the ion temperature. Up to three mode conversions appear to be possible, but two mode conversions are seen consistently.

9081 (PPPL–3033) **Energetic/alpha particle effects on MHD modes and transport.** Cheng, C.Z. (Princeton Univ., NJ (United States). Plasma Physics Lab.); Budny, R.; Chen, L. Princeton Univ., NJ (United States). Plasma Physics Lab. Jan 1995. 23p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH03073 ; FG02-91ER54109 ; FG03-92ER54150 ; FG03-94ER54271. (IAEA-CN–60/D-3-III-2). Order Number DE95006230. Source: OSTI; NTIS; INIS; GPO Dep.

A nonvariational kinetic-MHD stability code (NOVA-K) has been employed to study TAE stability in TFRR D-T and DIII-D experiments and to achieve understanding of TAE instability drive and damping mechanism. Reasonably good agreement between theory and experiment has been obtained. In these experiments the dominant damping mechanism is due to both the thermal ion Landau damping and/or the beam ion Landau damping. Based on ITER EDA parameters, the TAE modes are expected to be unstable in normal ITER operations. Energetic particle transport has been studied using a test particle code (ORBIT). Energetic particle loss scales linearly with the TAE mode amplitude and can be large for TFRR and DIII-D for $\delta B_r/B > 10^{-4}$ due to large banana orbit. From quasi-linear (ORBIT) and nonlinear kinetic-MHD (MH3D-K) simulations the saturation of TAE modes is due to nonlinear wave particle trapping and energetic particle profile modification in both radial and energy space. Finally, a convective bucket transport mechanism by MHD waves with time-dependent frequency is presented. Based on the energy-selective characteristics of the bucket transport mechanism, undesirable particles such as helium ash can be removed from the plasma core efficiently.

9082 (PPPL–3034) **Design studies for ITER x-ray diagnostics.** Hill, K.W.; Bitter, M.; von Goeler, S.; Hsuan, H. Princeton Univ., NJ (United States). Plasma Physics Lab. Jan 1995. 34p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH03073. (ITER/US–94/PH-07-14). Order Number DE95006228. Source: OSTI; NTIS; INIS; GPO Dep.

Concepts for adapting conventional tokamak x-ray diagnostics to the harsh radiation environment of ITER include use of grazing-incidence (GI) x-ray mirrors or man-made Bragg multilayer (ML) elements to remove the x-ray beam from the neutron beam, or use of bundles of glass-capillary x-ray "light pipes" embedded in radiation shields to reduce the neutron/gamma-ray fluxes onto the detectors while maintaining usable x-ray throughput. The x-ray optical element with the broadest bandwidth and highest throughput, the GI mirror, can provide adequate lateral deflection (10 cm for a deflected-path length of 8 m) at x-ray energies up to 12, 22, or 30 keV for one, two, or three deflections, respectively. This element can be used with the broad band, high intensity x-ray imaging system (XIS), the pulseheight analysis (PHA) survey spectrometer, or the high resolution Johann x-ray crystal spectrometer (XCS), which is used for ion-temperature measurement. The ML mirrors can isolate the detector from the neutron beam with a single deflection for energies up to 50 keV, but have much narrower bandwidth and lower x-ray power throughput than do the GI mirrors; they are unsuitable for use with the XIS or PHA, but they could be used with the XCS; in particular, these deflectors could be used between ITER and the biological shield to avoid direct plasma neutron streaming through the biological shield. Graded-d ML mirrors have good reflectivity from 20 to 70 keV, but still at grazing angles (<3 mrad). The efficiency at 70 keV for double reflection (10 percent), as required for adequate separation of the x-ray and neutron beams, is high enough for PHA requirements, but not for the XIS. Further optimization may be possible.

9083 (PPPL–3036) **Role of MHD activity in LH-assisted discharges in the PBX-M tokamak.** Talvard, M. (Association Euratom-CEA, Centre d'Etudes de Cadarache, 13 - Saint-Paul-lez-Durance (France). Dept. de Recherches sur la Fusion Controlee); Bell, R.E.; Bernabei, S.; Kaye, S.; Okabayashi, M.; Sesnic, S.; von Goeler, S. Princeton Univ., NJ (United States). Plasma Physics Lab. Jan 1995. 34p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH03073. Order Number DE95006229. Source: OSTI; NTIS; INIS; GPO Dep.

A data base for the 1993 run period of PBX-M has been documented (i) to investigate whether it was possible to forecast the development of MHD instabilities often observed in LH assisted discharges and (ii) to detail the origin, the nature and the effects of those instabilities. The deposition radius of the RF current, the plasma internal inductance and the LH power are used to separate MHD active and quiescent regimes prior the MHD onset. 1/1, 2/1, 3/1 global modes driven by the m = 2, n = 1 component are observed in discharges with LHCD. The destabilization is attributed to an increase of the current density gradient within the q = 2 surface. MHD fluctuations reduce the soft x-ray and hard x-ray intensities mainly around the RF current deposition radius. Minor disruptions with large inversion radii and mode locking are analyzed. Pi possible precursor to the MHD is evidenced on the hard x-ray horizontal profiles. A resonance between fast trapped electrons and turbulent waves present in the background plasma is proposed to support the observations.

9084 (PPPL–3038) **X-ray laser studies using plasmas created by optical field ionization.** Krushelnick, K.M.; Tighe, W.; Suckewer, S. Princeton Univ., NJ (United States). Plasma Physics Lab. Jan 1995. 24p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH03073. Order Number DE95006374. Source: OSTI; NTIS; INIS; GPO Dep.

X-ray laser experiments involving the creation of fast recombining plasmas by optical field ionization of preformed targets were conducted. A nonlinear increase in the intensity of the 13.5nm Lyman-α line in Li III with the length of the target plasma was observed but only for distances less than the laser confocal parameter and for low plasma electron temperatures. Multiphoton pumping of resonant atomic transitions was also examined and the process of multiphoton ionization of FIII was found to be more probable than multiphoton excitation.

9085 (PPPL–3040) **Field-aligned coordinates for nonlinear simulations of tokamak turbulence.** Beer, M.A.; Cowley, S.C.; Hammett, G.W. Princeton Univ., NJ (United States). Plasma Physics Lab. Nov 1994. 44p. Sponsored by USDOE, Washington, DC (United States);National Science Foundation, Washington, DC (United States). DOE Contract AC02-76CH03073 ; FG03-93ER54224. Order Number DE95006190. Source: OSTI; NTIS; INIS; GPO Dep.

Turbulence in tokamaks is characterized by long parallel wavelengths and short perpendicular wavelengths. We describe a coordinate system for nonlinear fluid, gyrokinetic "Vlasov", or particle simulations that exploits the elongated nature of the turbulence by resolving the minimum necessary simulation volume: a long thin twisting flux tube. It is very similar to the ballooning representation, although periodicity constraints can be incorporated in a manner that allows E x B nonlinearities to be evaluated efficiently with FFTs. If the parallel correlation length is very long, however, enforcing periodicity can introduce artificial correlations, so periodicity should not necessarily be enforced in poloidal angle at $\theta = \pm\pi$. We discuss the advantages and limitations of this approach, with application to 3D simulations of toroidal Ion Temperature Gradient (ITG) driven turbulence.

9086 (PPPL–3042) **Formation of core transport barrier and CH-Mode by ion Bernstein wave heating in PBX-M.** Ono, M. (and others); Bell, R.; Bernabei, S.; Gettelfinger, G.; Hatcher, R.; Kaita, R.; Kaye, S.; Kugel, H.; LeBlanc, B.; Manickam, J. Princeton Univ., NJ (United States). Plasma Physics Lab. Jan 1995. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH03073. Order Number DE95006373. Source: OSTI; NTIS; INIS; GPO Dep.

Observation of core transport barrier formation (for particles, ion and electron energies, and toroidal momentum) by ion Bernstein wave heating (IBWH) in PBX-M plasma is reported. The formation of a transport barrier leads to a strong peaking and significant increase of the core pressure (70%) and toroidal momentum (20%), and has been termed the core-high confinement mode (CH-Mode). This formation of a transport barrier is consistent, in terms of the expected barrier location as well as the required threshold power,

with a theoretical model based on the poloidal sheared flow generation by the ion Bernstein wave power. The use of ion Bernstein wave (IBW) induced sheared flow as a tool to control plasma pressure and bootstrap current profiles shows a favorable scaling for the use in future reactor grade tokamak plasmas.

9087 (PPPL–3044) **Flow shear induced fluctuation suppression in finite aspect ratio shaped tokamak plasma.** Hahm, T.S. (Princeton Univ., NJ (United States). Plasma Physics Lab.); Burrell, K.H. Princeton Univ., NJ (United States). Plasma Physics Lab. Jan 1995. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH03073. Order Number DE95006189. Source: OSTI; NTIS; INIS; GPO Dep.

The suppression of turbulence by the E x B flow shear and parallel flow shear is studied in an arbitrary shape finite aspect ratio tokamak plasma using the two point nonlinear analysis previously utilized in a high aspect rat& tokamak plasma. The result shows that only the E x B flow shear is responsible for the suppression of flute-like fluctuations. This suppression occurs regardless of the plasma rotation direction and is therefore, relevant for the VH mode plasma core as well as for the H mode plasma edge. Experimentally observed in-out asymmetry of fluctuation reduction behavior can be addressed in the context of flux expansion and magnetic field pitch variation on a given flux surface. The adverse effect of neutral particles on confinement improvement is also discussed in the context of the charge exchange induced parallel momentum damping.

9088 (PPPL–3045) **Alpha particle loss in the TFTR DT experiments.** Zweben, S.J. (and others); Darrow, D.S.; Herrmann, H.W. Princeton Univ., NJ (United States). Plasma Physics Lab. Jan 1995. 57p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH03073. Order Number DE95006188. Source: OSTI; NTIS; INIS; GPO Dep.

Alpha particle loss was measured during the TFTR DT experiments using a scintillator detector located at the vessel bottom in the ion grad-B drift direction. The DT alpha particle loss to this detector was consistent with the calculated first-orbit loss over the whole range of plasma current I=0.6-2.7 MA. In particular, the alpha particle loss rate per DT neutron did not increase significantly with fusion power up to 10.7 MW, indicating the absence of any new "collective" alpha particle loss processes in these experiments.

9089 (PPPL-CFP–3185) **Exploration of low-aspect-ratio tokamak regimes in the CDX-U and TS-3 devices.** Hwang, Y.S. (and others); Yamada, M.; Jones, T.G. Princeton Univ., NJ (United States). Plasma Physics Lab. [1994]. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH03073. (IAEA-CN–60/A5-II-6-2; CONF-940933–25: 15. international conference on plasma physics and controlled nuclear fusion research, Seville (Spain), 26 Sep - 1 oct 1994). Order Number DE95005540. Source: OSTI; NTIS; INIS; GPO Dep.

In the low-aspect-ratio tokamak regime, a lower q(a) regime (i.e. $q(a) \leq 5$, $A = R/a \approx 1.5$) has been explored in CDX-U, and the ultra-low-aspect-ratio tokamak regime ($1.05 \leq A \leq 1.5$) has been explored in TS-3. Using a relatively low toroidal magnetic field, plasma discharges with $I_p \leq 53$ kA, and $q(a) \geq 4$ [$q_{cyl}(a) \geq 1$] have been obtained in CDX-U. Low q(a), Ohmic plasmas in CDX-U show increasing MHD activity as the edge safety factor is lowered. These modes appear to reduce the current ramp-up rate and, at present, limit the access to even lower q(a) regimes. An experiment carried out in the ULART regime ($A \approx 1.05 - 1.5$) on the TS-3 device identifies a threshold of $q(a) \geq 3$ with $q_{cyl}(a) < 1$ for stability of global tilt/shift modes.

7004 Fusion Technology

Refer also to citation(s) 7524, 7525, 7526, 7527, 7528, 7529, 7530, 7531, 7532, 7674, 8070, 8102, 8105, 8212, 9045

9090 (ANL/EP/SUMM–84775) **Validation of tritium transport models for Li_2O.** Billone, M.C. (Argonne National Lab., IL (United States). Fusion Power Program); Kopasz, J.P.; Attaya, H. Argonne National Lab., IL (United States). [1992]. 32p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9210255–4: International workshop on ceramic breeder blanket interactions, Tokyo (Japan), 26-29 Oct 1992). Order Number DE95004619. Source: OSTI; NTIS (US Sales Only); GPO Dep.

Includes viewgraphs.

The properties data base for tritium diffusivity, desorption, adsorption, solubility, and precipitation in Li_2O is reviewed. These data are based on laboratory experiments on irradiated and unirradiated Li_2O. A set of mathematical models for these phenomena have been developed and incorporated into the TIARA (steady-state) and DISPL2 (steady-state and transient) computer codes. The solution procedures for both codes have been verified by comparing numerical solutions to text book solutions for idealized problems. The validation of these codes is really a validation of the models and properties incorporated into them for tritium transport/retention mechanisms.

9091 (ANL/EP/VU–84771) **Optimization of beryllium for fusion blanket applications.** Billone, M.C. (Argonne National Lab., IL (United States). Fusion Power Program). Argonne National Lab., IL (United States). [1993]. 32p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9310182–2-Vugraphs: Workshop on beryllium for fusion applications, Karlsruhe (Germany), 4-5 Oct 1993). Order Number DE95004637. Source: OSTI; NTIS; INIS; GPO Dep.

The primary function of beryllium in a fusion reactor blanket is neutron multiplication to enhance tritium breeding. However, because heat, tritium and helium will be generated in and/or transported through beryllium and because the beryllium is in contact with other blanket materials, the thermal, mechanical, tritium/helium and compatibility properties of beryllium are important in blanket design. In particular, tritium retention during normal operation and release during overheating events are safety concerns. Accommodating beryllium thermal expansion and helium-induced swelling are important issues in ensuring adequate lifetime of the structural components adjacent to the beryllium. Likewise, chemical/metallurgical interactions between beryllium and structural components need to be considered in lifetime analysis. Under accident conditions the chemical interaction between beryllium and coolant and breeding materials may also become important. The performance of beryllium in fusion blanket applications depends on fabrication variables and operational parameters. First the properties database is reviewed to determine the state of knowledge of beryllium performance as a function of these variables. Several design calculations are then performed to indicate ranges of fabrication and operation variables that lead to optimum beryllium performance. Finally, areas for database expansion and improvement are highlighted based on the properties survey and the design sensitivity studies.

9092 (ANL/EP/VU–84785) **Beryllium in the ITER blanket.** Billone, M.C. Argonne National Lab., IL (United States). [1995]. 31p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9111209–1-Vugraphs: Beryllium technology workshop, Clearwater Beach, FL (United States), 20 Nov 1991). Order Number DE95004620. Source: OSTI; NTIS; GPO Dep.

This paper consists of viewgraphs used in a presentation on the application of beryllium in breeding blankets for ITER and JET. The paper brings together data on the physical, thermal, mechanical, and chemical properties of beryllium and beryllium oxide for this type of application, as well as issues of compatibility with construction materials, and irradiation experience. It includes the results from testing programs carried out to arrive at some of the information, including fabrication work, irradiation experiments, and sample tests performed both in and out of the irradiation piles.

9093 (ANL/ET/CP–82008) **Effect of dynamically charged helium on mechanical properties of vanadium-base alloys.** Chung, H.M.; Loomis, B.A.; Smith, D.L. Argonne National Lab., IL (United States). Aug 1994. 14p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-940657–7: 17. symposium on effects of radiation on materials, Sun Valley, ID (United States), 20-23 Jun 1994). Order Number DE95004613. Source: OSTI; NTIS; INIS; GPO Dep.

One property of the vanadium-based alloys that is not well understood for the purpose of application as fusion reactor structural material is the effect of simultaneous generation of helium and

neutron damage under conditions relevant to fusion-reactor operation. In the present dynamic helium charging experiment (DHCE), helium was produced uniformly in the specimen at linear rates ranging from ~0.4 to 4.2 appm helium/dpa by the decay of tritium during irradiation to 18-31 dpa at 425-600°C in the Li-filled DHCE capsules in the Fast Flux Test Facility. This paper presents results of postirradiation tests of mechanical properties of V-4Cr-4Ti alloy which has been identified as the most promising candidate alloy on the basis of its superior baseline and irradiation properties. Effects of helium on tensile strength and ductility were insignificant for test temperatures >420°C. However, room-temperature ductilities of the DHCE specimens were higher than those of the non-DHCE specimens (negligible helium generation) whereas strengths were lower, indicating that different types of hardening centers are produced during the DHCE and non-DHCE irradiation. Ductile-brittle transition behavior of the DHCE specimens was also determined from bend tests on TEM disks and broken tensile specimens. No brittle behavior was observed at temperatures >−150°C for DHCE specimens. Predominantly brittle-cleavage fracture morphologies were observed only at −196°C in some specimens that were irradiated to 31 dpa at 425°C during DHCE. In strong contrast to tritium-trick experiments in which a large amount of helium is produced in absence of displacement damage, no intergranular fracture was observed in any tensile or bend-tested specimens that were irradiated in the DHCE.

9094 (ANL/FPP/TM–272) **A three-bar model for ratcheting of fusion reactor first wall.** Wolters, J.; Majumdar, S. Argonne National Lab., IL (United States). Dec 1994. 65p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. Order Number DE95007019. Source: OSTI; NTIS; INIS; GPO Dep.

First wall structures of fusion reactors are subjected to cyclic bending stresses caused by inhomogeneous temperature distribution during plasma burn cycles and by electromagnetically induced impact loads during plasma disruptions. Such a combination of loading can potentially lead to ratcheting or incremental accumulation of plastic strain with cycles. An elastic-plastic three-bar model is developed to investigate the ratcheting behavior of the first wall.

9095 (ANL/FPP/TM–273) **Radioactivity computation of steady-state and pulsed fusion reactors operation.** Attaya, H. Argonne National Lab., IL (United States). Nov 1994. 20p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. Order Number DE95006852. Source: OSTI; NTIS; INIS; GPO Dep.

The International Thermonuclear Report (ITER) is expected to operate in a pulsed operational mode. Accurate radioactivity calculations, that take into account this mode of operation, are required in order to determine precisely the different safety aspects of ITER. The authors previous examined analytically the effect of pulsed operation in ITER and showed how it depends on the burn time, the dwell time, and the half-lives. That analysis showed also that for ITER's low duty factor, using the continuous operation assumption would considerably overestimate the radioactivities, for a wide range of half-lives. At the same time, the large improvements in the quality and the quantity of the decay and the cross-section data libraries has considerably increased the computation times of the radioactivity calculations. For both reasons it is imperative to seek different methods of solution that reduce the computational time and can be easily adopted to the treatment of the pulsed operation. In this work, they have developed algorithms based on several mathematical methods that were chosen based on their generality, reliability, stability, accuracy, and efficiency. These methods are the matrix Schuer decomposition, the eigenvector decomposition, and the Pade approximation for the matrix exponential functions.

9096 (ANL/FPP/TM–275) **Shakedown analysis of fusion reactor first wall.** Majumdar, S. Argonne National Lab., IL (United States). Dec 1994. 27p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. Order Number DE95006148. Source: OSTI; NTIS; INIS; GPO Dep.

Shakedown analyses of a typical fusion reactor first wall including coolant channels subjected to cyclic thermal/steady primary and cyclic primary/steady thermal stresses are carried out. The stresses are assumed to be predominantly of the bending type. The first cycle of loading/unloading is analyzed using elastic-plastic beam bending theory. The general problem of shakedown is solved using the shakedown theorem of perfect plasticity.

9097 (FRCEA-TH–395) **Study and realization of a power circuit of a superconducting dipole generator of a magnetic field.** Rouanet, E. Association Euratom-CEA, Centre d'Etudes de Cadarache, 13 - Saint-Paul-lez-Durance (France). Dept. de Recherches sur la Fusion Controlee; Conservatoire National des Arts et Metiers (CNAM), 75 - Paris (France). 4 Nov 1993. 129p. (In French). Order Number DE95614262. Source: OSTI; NTIS (US Sales Only); INIS.

The project of experimental reactor building on controlled fusion (I.T.E.R) needed the development of a superconducting cable made of niobium-tin. Tested with a current of fifty kilo amperes under a twelve tesla constant field, this cable has to be tested under a variable field. The installation of the power circuit of the dipole field generator, consisted to the study and realization of the four following points: an important power cable; a tension protection organ of the dipole, under a seventeen milli Henrys inductance and four kilo amperes; a current regulating system given by the generator; a complete pilot system of the test station.

9098 (IA–1486, pp. 73) **Changes in surface topography of Fcc metals due to helium bombardment.** Moreno, D.; Abramov, E.; Eliezer, D. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993*. 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. FIRST WALL/physical radiation effects; BLISTERS; COPPER; CORROSION; CRYSTALLOGRAPHY; ENERGY DEPENDENCE; FCC LATTICES; HELIUM IONS; ION BEAM TARGETS; LAYERS; MONOCRYSTALS; NICKEL; POLYCRYSTALS; POST-IRRADIATION EXAMINATION; SCANNING ELECTRON MICROSCOPY; SPUTTERING; STOCHASTIC PROCESSES; SURFACE PROPERTIES

9099 (IA–1486, pp. 73-74) **Synergistic effect of helium and hydrogen on copper single crystal.** Moreno, D.; Eliezer, D. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993*. 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. COPPER/physical radiation effects; COPPER; COPPER OXIDES; CRYSTAL LATTICES; HELIUM IONS; HYDROGEN; HYDROGEN EMBRITTLEMENT; HYDROGEN IONS; ION IMPLANTATION; MONOCRYSTALS; SURFACE PROPERTIES

9100 (IA–1486, pp. 78) **Surface behavior of first-wall due to the synergistic effect of helium and hydrogen isotopes.** Abramov, E.; Moreno, D.; Solovioff, G.; Eliezer, D. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993*. 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. FIRST WALL/microstructure; BERYLLIUM ALLOYS; COPPER; COPPER ALLOYS; MICROSTRUCTURE; HYDRIDATION; HYDROGEN EMBRITTLEMENT; INCLUSIONS; ION IMPLANTATION; NICKEL; SURFACE PROPERTIES; SYNERGISM; WALL LOADING

9101 (IA–1486, pp. 78) **Hydrogen trapping in nickel preimplanted with helium.** Abramov, A.; Solovioff, G.; Eliezer, D. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993*. 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. NICKEL/interstitial helium generation; NICKEL/interstitial hydrogen generation; BUBBLES; COMPUTERIZED SIMULATION; CRYSTAL LATTICES; DESORPTION; FIRST WALL; HEAT TREATMENTS; HYDROGEN ISOTOPES; INCLUSIONS; ION IMPLANTATION; NICKEL; TRAPPING

9102 (INIS-mf–14440, pp. 5-6) **Increase gain of volume ignition.** Khoda-Bakhash, R. Iranian Physics Society, Teheran (Iran, Islamic Republic of); Urmia Univ. (Iran, Islamic Republic of). Aug 1994. 91p. (In English, Persian). (CONF-9408203–: Annual physics conference of Iran, Sanandaj (Iran, Islamic Republic of), 19

Aug - 1 sep 1994). In *Abstracts of annual physics conference of Iran, 1373 Kordestan University.* Order Number DE95611717. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. THERMONUCLEAR IGNITION; INERTIAL CONFINEMENT; THERMONUCLEAR REACTIONS

9103 (INIS-mf–15087) **Completing a plant to simulate the plasma/wall interaction in a fusion reactor. Final report.** Behrendt, H.; Bohmeyer, W. No corporate text available. May 1993. 15p. (In German). Sponsored by Bundesministerium fuer Forschung und Technologie, Bonn (Germany). Foerderkennzeichen BMFT 13N6116. Order Number DE95738839. Source: OSTI; NTIS (US Sales Only); INIS.

The aim of the investigations was to carry out constant monitoring of the critical signals and to introduce a quick switch-off if the limits were exceeded. A sufficient number of measurement places was provided in the cathode/heater/scren/anode area and the typical working parameters and changes in case of a fault were measured. The result of the work showed that both statistically occurring short heavy current discharges and changes of potential at the components could lead to switching off. Switch-off times of less than 10 ms were achieved, which largely prevent damage to the plant. (orig./DG)

9104 (ITER-TN-BL–5-0-3) **U.S. technical report for the ITER blanket/shield: A. blanket: Topical report, July 1990–November 1990.** Argonne National Lab., IL (United States); Oak Ridge National Lab., TN (United States). [1995]. 257p. Sponsored by USDOE, Washington, DC (United States);Oak Ridge National Lab., TN (United States). DOE Contract W-31109-ENG-38 ; AC05-84OR21400. Order Number DE95004667. Source: OSTI; NTIS; INIS; GPO Dep.

Three solid-breeder water-cooled blanket concepts have been developed for ITER based on a multilayer configuration. The primary difference among the concepts is in the fabricated form of breeder and multiplier. All the concepts have beryllium for neutron multiplication and solid-breeder temperature control. The blanket design does not use helium gaps or insulator material to control the solid breeder temperature. Lithium oxide (Li_2O) and lithium zirconate (Li_2ZrO_3) are the primary and the backup breeder materials, respectively. The lithium-6 enrichment is 95%. The use of high lithium-6 enrichment reduces the solid breeder volume required in the blanket and consequently the total tritium inventory in the solid breeder material. Also, it increases the blanket capability to accommodate power variation. The multilayer blanket configuration can accommodate up to a factor of two change in the neutron wall loading without violating the different design guidelines. The blanket material forms are sintered products and packed bed of small pebbles. The first concept has a sintered product material (blocks) for both the beryllium multiplier and the solid breeder. The second concept, the common ITER blanket, uses a packed bed breeder and beryllium blocks. The last concept is similar to the first except for the first and the last beryllium zones. Two small layers of beryllium pebbles are located behind the first wall and the back of the last beryllium zone to reduce the total inventory of the beryllium material and to improve the blanket performance. The design philosophy adopted for the blanket is to produce the necessary tritium required for the ITER operation and to operate at power reactor conditions as much as possible. Also, the reliability and the safety aspects of the blanket are enhanced by using low-pressure water coolant and the separation of the tritium purge flow from the coolant system by several barriers.

9105 (JINR-E–9-94-237) **Free Electron Laser as Energy Driver for Inertial Confinement Fusion.** Saldin, E.L. (Automatic Systems Corporation, Samara (Russian Federation)); Shnejdmiller, E.A.; Ul'yanov, Yu.N.; Sarantsev, V.P.; Yurkov, M.V. Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1994. 42p. Order Number DE95614252. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Nuclear Instruments and Methods in Physics Research. Section A, Accelerators, Spectrometers, Detectors and Associated Equipment.

A FEL based energy driver for Inertial Confinement Fusion (ICF) is proposed. The key element of the scheme is free electron laser system. Novel technical solutions reveal a possibility to construct the FEL system operating at radiation wavelength $\lambda = 0.5$ μm and providing flash energy E = 1 MJ and brightness 4×10^{22} W cm^{-2} sr^{-1} within steering pulse duration 0.1-2 ns. Total energy efficiency of the proposed ICF energy driver is about of 11% and repetition rate is 40 Hz. Dimensions of such an ICF driver are comparable with those of heavy-ion ICF driver, while the problem of technical realization seems to be more realistic. It is shown that the FEL based ICF energy driver may be constructed at the present level of accelerator technique R and D. 27 refs., 10 figs., 3 tabs.

9106 (KAERI/RR–1363/93) **Development of tokamak experiment technology -A study on the nuclear fusion reactor-.** Lee, Kwang Won (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Hwang, Chul Kew; In, Sang Ryul; Kim, Sung Kyu; Oh, Byung Hoon; Jeong, Seung Ho; Hong, Bong Guen; Yoon, Jae Sung; Yoon, Byung Joo; Song, Woo Sup; Park, Byung Ho; Park, Byung Ki; LKorea Cancer Center Hospital, Seoul (Korea, Republic of). Jul 1994. 211p. (In Korean). Order Number DE95614255. Source: OSTI; NTIS; INIS.

Overall test operation of KT-1 tokamak has been done with the modified power supplies and constructed plasma position feedback control system. The achieved plasma parameters of KT-1 are Ip (plasma current) > 15 kA (9ms) and Td (plasma current sustaining time) > 12 ms (7.5 kA) until now. Instrumentations for the carbonization/boronization are also equipped and applied to the first boronization of invessel components of KT-1 tokamak. As a preliminary treatment of the 1st wall of tokamak vacuum torus, RG discharge cleaning has been done. Plasma qualities have been improved by discharge cleaning. In addition, helicon plasma device is designed succeeding exploitation of the first wall conditioning program which are all for the development of conditioning technology of 1st wall facing the plasma. As a part of the development program on the plasma monitoring technologies, conceptual design study on the FIR interferometer- polarimeter is accomplished. Parallel to these experimental activities, an effort has been made in designing the operating scenario of poloidal field system of KT-2 tokamak. (Author).

9107 (KAERI/RR–1364/93) **The development of the tokamak system technology -A study on the fusion reactor-.** In, Sang Ryul (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Hwang, Chul Kew; Lee, Kwang Won; Kim, Sung Kyu; Oh, Byung Hoon; Jeong, Seung Ho; Hong, Bong Guen; Yoon, Jae Sung; Yoon, Byung Joo; Song, Woo Sup; Chung, Moon Kyu. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jul 1994. 170p. (In Korean). Order Number DE95614256. Source: OSTI; NTIS; INIS.

1. Object of the project - Completion of KT-2 tokamak device concept definition - completion of preliminary conceptual design and assurance of technical feasibility 2. Content and scope of the study - KT-2 concept definition - Identification of research goal and program/Derivation of basic specifications of the plasma and the tokamak - Preliminary conceptual design of core components - magnets, power sources, vacuum system, auxilliary heating system. 3. Results of the research - Definition of KT-2 tokamak concept - A medium-sized, large-aspect-ratio bootstrap tokamak with fast-wave current-drive· - Numerical scoping for performance and identification of KT-2 operation regimes-General specification from zero-dimensional analysis using TETRA/Magnetic configuration and MHD equilibrium properties with FBT/Basic specification of the PF system and derivation of basic operation scenario. - Preliminary conceptual design study-Basic specification of the magnet-power supply system and the vacuum system for detailed engineering study in the next step/General specification for auxiliary system necessary for research goal and subsequent device concept. (Author).

9108 (KFK–5179) **Compatibility of graphite with a martensitic-ferritic steel, an austenitic stainless steel and a Ni-base alloy up to 1250 C.** Hofmann, P. (Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Materialforschung); Markiewicz, M. Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Kernfusion; Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Materialforschung. Aug 1994. 51p. Order Number DE95738281. Source: OSTI; NTIS (US Sales Only); INIS.

To study the chemical interactions between graphite and a martensitic-ferritic steel (1.4914), an austenitic stainless steel (1.4919; AISI 316), and a Ni-base alloy (Hastelloy X) isothermal reaction experiments were performed in the temperature range between 900 and 1250 C. At higher temperatures a rapid and complete liquefaction of the components occurred as a result of eutectic interactions. The chemical interactions are diffusion-controlled processes and can be described by parabolic rate laws. The reaction behavior of the two steels is very similar. The chemical interactions of the steels with graphite are much faster above 1100 C than those for the Ni-base alloy. Below 1000 C the effect is opposite. (orig.)

9109 (KFK–5296, pp. 21-26) **Plan of new stage fusion R and D in Japan.** Kondo, T. (JAERI, Tokai Research Establishment, Ibaraki (Japan)). Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Materialforschung; Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Kernfusion; Association Euratom-Kernforschungszentrum Karlsruhe GmbH (KFK) (Germany). May 1994. 310p. (CONF-9209212–: International Energy Agency (IEA) workshop on intense neutron sources, Karlsruhe (Germany), 21-23 Sep 1992). In *Proceedings of the IEA-workshop on intense neutron sources. IEA-implementing agreement for a programme of research and development on fusion materials. Working group task - annex II.* Order Number DE95738768. Source: OSTI; NTIS (US Sales Only); INIS.

The paper presents in foil form the plan of the new stage of research and development fusion in Japan.

9110 (KFK–5296, pp. 27-36) **U.S. strategy for the development of fusion reactors.** Wiffen, F.W. (US Dept. of Energy, Office of Fusion Energy, Washington, DC (United States)). Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Materialforschung; Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Kernfusion; Association Euratom-Kernforschungszentrum Karlsruhe GmbH (KFK) (Germany). May 1994. 310p. (CONF-9209212–: International Energy Agency (IEA) workshop on intense neutron sources, Karlsruhe (Germany), 21-23 Sep 1992). In *Proceedings of the IEA-workshop on intense neutron sources. IEA-implementing agreement for a programme of research and development on fusion materials. Working group task - annex II.* Order Number DE95738768. Source: OSTI; NTIS (US Sales Only); INIS.

The paper presents in foil form the U.S. strategy of the development of fusion reactors.

9111 (KFK–5296, pp. 37-43) **Fusion Programme Evaluation Board.** Darvas, J. (Commission of the European Communities, Brussels (Belgium). Technology Div.). Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Materialforschung; Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Kernfusion; Association Euratom-Kernforschungszentrum Karlsruhe GmbH (KFK) (Germany). May 1994. 310p. (CONF-9209212–: International Energy Agency (IEA) workshop on intense neutron sources, Karlsruhe (Germany), 21-23 Sep 1992). In *Proceedings of the IEA-workshop on intense neutron sources. IEA-implementing agreement for a programme of research and development on fusion materials. Working group task - annex II.* Order Number DE95738768. Source: OSTI; NTIS (US Sales Only); INIS.

The paper presents in foil form the planning of the European Fusion Program.

9112 (KFK–5296, pp. 45-66) **Materials development for DEMO and commercial fusion reactors.** Bloom, E. (Oak Ridge National Lab., Inc., TN (United States)). Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Materialforschung; Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Kernfusion; Association Euratom-Kernforschungszentrum Karlsruhe GmbH (KFK) (Germany). May 1994. 310p. (CONF-9209212–: International Energy Agency (IEA) workshop on intense neutron sources, Karlsruhe (Germany), 21-23 Sep 1992). In *Proceedings of the IEA-workshop on intense neutron sources. IEA-implementing agreement for a programme of research and development on fusion materials. Working group task - annex II.* Order Number DE95738768. Source: OSTI; NTIS (US Sales Only); INIS.

The paper presents in foil form the development of materials for DEMO and commercial fusion reactors.

9113 (KFK–5296, pp. 67-78) **New fusion research and development stage with an experimental reactor.** Kondo, T. (JAERI, Tokai Research Establishment, Ibaraki (Japan)). Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Materialforschung; Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Kernfusion; Association Euratom-Kernforschungszentrum Karlsruhe GmbH (KFK) (Germany). May 1994. 310p. (CONF-9209212–: International Energy Agency (IEA) workshop on intense neutron sources, Karlsruhe (Germany), 21-23 Sep 1992). In *Proceedings of the IEA-workshop on intense neutron sources. IEA-implementing agreement for a programme of research and development on fusion materials. Working group task - annex II.* Order Number DE95738768. Source: OSTI; NTIS (US Sales Only); INIS.

The paper presents in foil form a new fusion research and development stage in Japan in which a tokamak type experimental reactor is regarded as a core machine.

9114 (KFK–5296, pp. 79-89) **Material development for fusion reactors.** Ehrlich, K. (Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Materialforschung 1). Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Materialforschung; Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Kernfusion; Association Euratom-Kernforschungszentrum Karlsruhe GmbH (KFK) (Germany). May 1994. 310p. (CONF-9209212–: International Energy Agency (IEA) workshop on intense neutron sources, Karlsruhe (Germany), 21-23 Sep 1992). In *Proceedings of the IEA-workshop on intense neutron sources. IEA-implementing agreement for a programme of research and development on fusion materials. Working group task - annex II.* Order Number DE95738768. Source: OSTI; NTIS (US Sales Only); INIS.

The paper presents in foil form the developments of materials for fusion reactors.

9115 (KFK–5296, pp. 91-94) **The role of intense neutron sources and other irradiation facilities in materials development.** Schiller, P. (CEC, Joint Research Centre, Materials Science Div., Ispra (Italy)). Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Materialforschung; Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Kernfusion; Association Euratom-Kernforschungszentrum Karlsruhe GmbH (KFK) (Germany). May 1994. 310p. (CONF-9209212–: International Energy Agency (IEA) workshop on intense neutron sources, Karlsruhe (Germany), 21-23 Sep 1992). In *Proceedings of the IEA-workshop on intense neutron sources. IEA-implementing agreement for a programme of research and development on fusion materials. Working group task - annex II.* Order Number DE95738768. Source: OSTI; NTIS (US Sales Only); INIS.

The paper presents in foil form the role of neutron sources and other irradiation facilities in the material development, the aim of which is to select, optimise, test and characterise materials for fusion devices and reactors.

9116 (KFK–5296, pp. 95-101) **The role of neutron irradiation facilities.** Ishino, T. (Tokyo Univ. (Japan). Dept. of Nuclear Engineering). Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Materialforschung; Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Kernfusion; Association Euratom-Kernforschungszentrum Karlsruhe GmbH (KFK) (Germany). May 1994. 310p. (CONF-9209212–: International Energy Agency (IEA) workshop on intense neutron sources, Karlsruhe (Germany), 21-23 Sep 1992). In *Proceedings of the IEA-workshop on intense neutron sources. IEA-implementing agreement for a programme of research and development on fusion materials. Working group task - annex II.* Order Number DE95738768. Source: OSTI; NTIS (US Sales Only); INIS.

The article presents in foil form the role of neutron irradiation facilities.

9117 (KFK–5296, pp. 103-113) **The role of intense neutron sources and other irradiation facilities in materials**

development for fusion. Wiffen, F.W. (US Dept. of Energy, Office of Fusion Energy, Washington, DC (United States)). Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Materialforschung; Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Kernfusion; Association Euratom-Kernforschungszentrum Karlsruhe GmbH (KFK) (Germany). May 1994. 310p. (CONF-9209212--: International Energy Agency (IEA) workshop on intense neutron sources, Karlsruhe (Germany), 21-23 Sep 1992). In *Proceedings of the IEA-workshop on intense neutron sources. IEA-implementing agreement for a programme of research and development on fusion materials. Working group task - annex II.* Order Number DE95738768. Source: OSTI; NTIS (US Sales Only); INIS.

The paper presents in foil form the role of intense neutron sources and other irradiation facilities in materials development for fussion.

9118 (KFK--5296, pp. 115-124) **Fusion energy and intense neutron sources in China.** Qian, J. (Fusion Nuclear Technology Lab., Southwestern Inst. of Physics (SWIP), Sichuan (China)). Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Materialforschung; Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Kernfusion; Association Euratom-Kernforschungszentrum Karlsruhe GmbH (KFK) (Germany). May 1994. 310p. (CONF-9209212--: International Energy Agency (IEA) workshop on intense neutron sources, Karlsruhe (Germany), 21-23 Sep 1992). In *Proceedings of the IEA-workshop on intense neutron sources. IEA-implementing agreement for a programme of research and development on fusion materials. Working group task - annex II.* Order Number DE95738768. Source: OSTI; NTIS (US Sales Only); INIS.

The article presents the Chinese strategy of the fusion reactor material development, especially of the intense neutron sources.

9119 (KFK--5296, pp. 203-229) **Mirror type plasma neutron source.** Ryutov, R. (Academy of Sciences, Inst. of Nuclear Physics, Novosibirsk (Russian Federation)). Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Materialforschung; Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Kernfusion; Association Euratom-Kernforschungszentrum Karlsruhe GmbH (KFK) (Germany). May 1994. 310p. (CONF-9209212--: International Energy Agency (IEA) workshop on intense neutron sources, Karlsruhe (Germany), 21-23 Sep 1992). In *Proceedings of the IEA-workshop on intense neutron sources. IEA-implementing agreement for a programme of research and development on fusion materials. Working group task - annex II.* Order Number DE95738768. Source: OSTI; NTIS (US Sales Only); INIS.

The paper presents in foil form a mirror-type plasma neutron source.

9120 (KFK--5296, pp. 231-237) **Mirror beam plasma neutron source.** Coensgen, F.H. (Lawrence Livermore National Lab., CA (United States)). Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Materialforschung; Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Kernfusion; Association Euratom-Kernforschungszentrum Karlsruhe GmbH (KFK) (Germany). May 1994. 310p. (CONF-9209212--: International Energy Agency (IEA) workshop on intense neutron sources, Karlsruhe (Germany), 21-23 Sep 1992). In *Proceedings of the IEA-workshop on intense neutron sources. IEA-implementing agreement for a programme of research and development on fusion materials. Working group task - annex II.* Order Number DE95738768. Source: OSTI; NTIS (US Sales Only); INIS.

The paper presents in foil form a mirror beam plasma neutron source for fusion reactor materials development and blanket component testing.

9121 (KFK--5296, pp. 239-253) **Mirror based fusion neutron sources for fusion material testing.** Kawabe, T. (Tsukuba Univ., Ibaraki (Japan). Inst. of Physics). Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Materialforschung; Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Kernfusion; Association Euratom-Kernforschungszentrum Karlsruhe GmbH (KFK) (Germany). May 1994. 310p. (CONF-9209212--: International Energy Agency (IEA) workshop on intense neutron sources, Karlsruhe (Germany), 21-23 Sep 1992). In *Proceedings of the IEA-workshop on intense neutron sources. IEA-implementing agreement for a programme of research and development on fusion materials. Working group task - annex II.* Order Number DE95738768. Source: OSTI; NTIS (US Sales Only); INIS.

The paper presents in foil form a mirror based source of fusion neutrons aimed for fusion material testing.

9122 (KFK--5365) **Study on the interaction of lithium orthosilicate with water vapor and hydrogen.** Huber, S. Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Radiochemie; Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Kernfusion; Karlsruhe Univ. (T.H.) (Germany). Fakultaet fuer Chemie. Sep 1994. 125p. (In German). Order Number DE95738117. Source: OSTI; NTIS (US Sales Only); INIS.

The present work discusses the adsorption of H_2O(g) as well as the reactions of D_2O(g) and D_2(g) with lithium orthosilicate (Li_4SiO_4), a potential tritium breeding ceramic for future fusion reactors. An apparatus was constructed which permits H_2O partial pressures as low as 1 μbar to be generated and subsequently measured with high accuracy and precision. Using the frontal analysis of gas chromatography, adsorption isotherms were determined at temperatures and water vapor pressures ranging from 653 to 1093 K and 1 to 10 μbar, respectively. Based upon the data, the tritium inventory at the surface of Li_4SiO_4(cr) can be estimated as function of temperature and water vapor concentration in the purge gas of a solid breeder blanket. The reactions of lithium orthosilicate with deuterium oxide and deuterium were studied at high temperature (1160 - 1420K) by means of Knudsen effusion mass spectrometry. In both cases the production of lithium hydroxide and the establishment of an equilibrium between LiOD(g) and D_2O(g) were observed; D_2O is derived from oxidation of deuterium, presumably under formation of a reduced surface layer. Equilibrium constants and reaction enthalpies were computed for the reaction of Li_4SiO_4(cr) with D_2O(g). In addition, the vapor pressure of LiOD(g) above Li_4SiO_4(cr) was determined as function of temperature and deuterium oxide pressure. Further experiments with lithium orthosilicate were carried out under flowing hydrogen in order to analyze the effects of temperature, H_2-concentration, gas flow, sample size and sample pretreatment on the formation of water vapor. The results confirm the mass spectrometric findings mentioned above. (orig.)

9123 (LBL--35635) **Elise - the next step in development of induction heavy ion drivers for inertial fusion energy.** Lee, E. (and others); Bangerter, R.O.; Celata, C.; Faltens, A.; Fessenden, T.; Peters, C.; Pickrell, J.; Reginato, L.; Seidl, P.; Yu, S. Lawrence Berkeley Lab., CA (United States). Nov 1994. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00098. (CONF-9411152--3: International Atomic Energy Agency (IAEA) technical committee meeting on drivers for inertial confinement fusion, Paris (France), 14-18 Nov 1994). Order Number DE95004679. Source: OSTI; NTIS; INIS; GPO Dep.

LBL, with the participation of LLNL and industry, proposes to build Elise, an electric-focused accelerator as the next logical step towards the eventual goal of a heavy-ion induction linac powerful enough to implode or "drive" inertial-confinement fusion targets. Elise will be at full driver scale in several important parameters-most notably line charge density (a function of beam size), which was not explored in earlier experiments. Elise will be capable of accelerating and electrostatically focusing four parallel, full-scale ion beams and will be designed to be extendible, by successive future construction projects, to meet the goal of the USA DOE Inertial Fusion Energy program (IFE). This goal is to address all remaining issues in heavy-ion IFE except target physics, which is currently the responsibility of DOE Defense Programs, and the target chamber. Thus Elise is the first step of a program that will provide a solid foundation of data for further progress toward a driver, as called for in the National Energy Strategy and National Energy Policy Act.

9124 (PNL-SA--24129) **In situ tritium from Li_2O and Li_2ZrO_3 irradiated in a fast neutron flux: BEATRIX-II, Phase 1 and 2.** Slagle, O.D. (Pacific Northwest Lab., Richland, WA (United States)); Hollenberg, G.W.; Kurasawa, T.; Verrall, R.A. Pacific Northwest Lab., Richland, WA (United States). Jun 1994. 22p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-9406171--5: 3. international

workshop on ceramic breeder blanket interactions, Los Angeles, CA (United States), 22-24 Jun 1994). Order Number DE95004573. Source: OSTI; NTIS; INIS; GPO Dep.

BEATRIX-II was an in situ tritium recovery experiment. This in situ tritium recovery experiment provided data on the performance of Li_2O and Li_2ZrO_3 under irradiation conditions covering a range of sweep gas compositions and temperatures. The experiment consisted of two separate irradiation cycles which in turn included two vented tritium recovery canisters each. Phase 1 operated for 300 Effective Full Power Days (EFPD) while Phase 2 operated for 203 EFPD of irradiation. The tritium recovery behavior of Li_2O and Li_2ZrO_3 was characterized using temperature transients, sweep gas composition changes and reactor power changes to effect changes in the tritium inventory. The high neutron flux level in FFTF resulted in high tritium generation rates which combined with a responsive tritium measurement system allowed detailed observations on the tritium recovery behavior of Li_2O and Li_2ZrO_3. During the course of the experiment a number of observations were made which did not appear consistent with a simplified view of the tritium recovery behavior of these materials. These observations included small negative tritium recovery peaks preceding the typical primary positive peaks; and, for specific temperature ranges, changes in tritium inventory which where opposite to the characteristic expected changes.

9125 (PPPL–3025) **Collaborations in fusion research.** Barnes, D.; Davis, S.; Roney, P. Princeton Univ., NJ (United States). Plasma Physics Lab. Jan 1995. 14p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH03073. Order Number DE95006372. Source: OSTI; NTIS; INIS; GPO Dep.

This paper reviews current experimental collaborative efforts in the fusion community and extrapolates to operational scenarios for the Tokamak Physics Experiment (TPX) and the International Thermonuclear Experimental Reactor (ITER). Current requirements, available technologies and tools, and problems, issues and concerns are discussed. This paper specifically focuses on the issues that apply to experimental operational collaborations. Special requirements for other types of collaborations, such as theoretical or design and construction efforts, will not be addressed. Our current collaborative efforts have been highly successful, even though the tools in use will be viewed as primitive by tomorrow's standards. An overview of the tools and technologies in today's collaborations can be found in the first section of this paper. The next generation of fusion devices will not be primarily institutionally based, but will be national (TPX) and international (ITER) in funding, management, operation and in ownership of scientific results. The TPX will present the initial challenge of real-time remotely distributed experimental data analysis for a steady state device. The ITER will present new challenges with the possibility of several remote control rooms all participating in the real-time operation of the experimental device. A view to the future of remote collaborations is provided in the second section of this paper.

9126 (SAND–94-1392C) **Progress in ion beam power coupling and ion-driven hohlraums on PBFA II.** Filuk, A.B. (and others); Mehlhorn, T.A.; Adams, R.G.; Allshouse, G.O.; Aubert, J.H.; Bacon, L.D.; Bailey, J.E.; Bloomquist, D.D.; Boyes, J.; Chandler, G.A. Sandia National Labs., Albuquerque, NM (United States). [1995]. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. (CONF-9411152–2: International Atomic Energy Agency (IAEA) technical committee meeting on drivers for inertial confinement fusion, Paris (France), 14-18 Nov 1994). Order Number DE95004544. Source: OSTI; NTIS; INIS; GPO Dep.

Light ions could provide an efficient driver for high-yield and energy applications of inertial confinement fusion. Working towards this goal, the authors have demonstrated well-diagnosed, ion-driven hohlraum targets at ~ 60 eV radiation temperature on the PBFA II accelerator, with specific power deposition of 800-1400 TW/gm. This parameter regime is of interest to both light- and heavy-ion drivers, and corresponds to the early phase of a high-yield target drive. Further increases in target temperature require increasing the ion beam driver intensity. Direct measurements of ion diode dynamics are providing insights to improve driver capability. Maximum beam intensity is obtained by both increasing the coupled lithium beam power and decreasing the beam microdivergence. The microdivergence of the beam near the ion source appears to be a major contributor early in the beam pulse. Experiments have shown that a parasitic non-lithium ion beam consumes a large fraction of the available power. Calculations indicate the coupled beam power can be increased by up to a factor of 3 by eliminating this parasitic loss. Preliminary experiments to clean the ion diode surfaces are under way.

99 GENERAL AND MISCELLANEOUS

9127 (BNL–52351-Rev.12/94) **Laboratory Directed Research and Development Program: Annual report to the Department of Energy.** Ogeka, G.J.; Romano, A.J. Brookhaven National Lab., Upton, NY (United States). Dec 1994. 109p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC02-76CH00016. Order Number DE95006375. Source: OSTI; NTIS; INIS; GPO Dep.

Project program summaries are presented for: effect of bacterial spore protein on mutagenesis; cellular toxicity of coaine and cocaethylene; calcinfication in marine alga (global carbon cycling); advanced permanent magnet materials; a high flux neutron source; genetics of drug addiction; microdialysis; analysis of powder diffraction data; accelerator technology; nucleic acids and proteins and their interactions, by small-angle XRD; enhancement of microplanar beam radiation therapy of gliosarcoma; relaxographic and functional MRI; low-temperature infrared laser absorption spectroscopy; photodesorption of H_2; helical magnet for RHIC; novel microporous solids; chemistry and physics of stratospheric aerosols (ozone depletion); rf source for linear colliders; resonance Raman detection of VOCs; synthesis of plant fatty acids with unusual double bond positions; outer surface proteins of the Lyme disease spirochete; multiwire proportional chambers for collider muons; self-organized criticality; PCR-SSCP detection of genetic changes at single cell level; proton facility for cancer therapy; and visible free-electron laser experiment.

9128 (DOE/ET–0136) **MOLIS: Minority On-Line Information Service: User's guide. Version 3.0/Release 3.0.** USDOE Office of Science Education and Technical Information, Washington, DC (United States). Sep 1994. 48p. Sponsored by USDOE, Washington, DC (United States). Order Number DE95002580. Source: OSTI; NTIS; GPO Dep.

This document is a user's guide to MOLIS, an information system for minority groups. Topics include: access to the system, system features, and guidelines for using the system.

9129 (UCRL–52000-94-10) **Energy and Technology Review.** Bookless, W.A.; McElroy, L.; Wheatcraft, D.; Middleton, C.; Shang, S. (eds.). Lawrence Livermore National Lab., CA (United States). Oct 1994. 28p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-48. Order Number DE95006377. Source: OSTI; NTIS; INIS; GPO Dep.

Two articles are included: the industrial computing initiative, and artificial hip joints (applying weapons expertise to medical technology). Three research highlights (briefs) are included: KEN project (face recognition), modeling groundwater flow and chemical migration, and gas and oil national information infrastructure.

9901 Management

Refer also to citation(s) 7316, 7470, 7475, 7655, 7696, 7750, 7883, 9167, 9170, 9199

9130 (DOE/IG–0364) **Audit of administration of the Department of Energy's small disadvantaged business program.** USDOE Office of Inspector General, Oak Ridge, TN (United States). Eastern Regional Audit Office. 19 Dec 1994. 31p. Sponsored by USDOE, Washington, DC (United States). Source: OSTI (Free of Charge).

Report to The Secretary.

The audit of this program at 5 DOE Management and Operating contractors disclosed that this program did not fully meet the intent of the Small Business Act and its implementing regulations. Vendors of questionable eligibility (not owned and managed by socially and economically disadvantaged individuals) received awards from each of these contractors. Also, small disadvantaged businesses did not always receive the "maximum practicable opportunity" to participate, as two contractors concentrated awards among a select few of the available vendors. Further, two contractors made awards to vendors that were brokers, inconsistent with the "regular dealer" requirements as defined in the Walsh-Healey Public Contracts Act. This report includes recommendations designed to improve this program (management generally concurred).

9131 (DOE/IG–0365) **Report on the inspection of the status of the disposal of technical Surveillance Equipment at the Central Training Academy, Albuquerque, New Mexico.** USDOE Office of Inspector General, Washington, DC (United States). Office of Inspections. 19 Dec 1994. 48p. Sponsored by USDOE, Washington, DC (United States). Source: OSTI (Free of Charge).

Report to The Secretary.

Objective of this inspection was to determine if the requirements of the August 13, 1991, memorandum from the former Secretary of Energy (regarding the transfer of technical surveillance equipment to local, state, or Federal law enforcement organizations) were implemented.

9132 (FEMP–2394) **Implementing the theories: A fully integrated project control system that's implemented and works.** Harris, R.E. Fernald Environmental Restoration Management Corp., Cincinnati, OH (United States). Fernald Environmental Management Project. 8 Dec 1994. 4p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC24-92OR21972. (CONF-941246–3: 2. annual EM cost management conference, San Francisco, CA (United States), 5-9 Dec 1994). Order Number DE95004943. Source: OSTI; NTIS; INIS; GPO Dep.

Using the theories presented in DOE Orders 4700.1, 1332.1A, and Notice 4700.5 as the basis for system design, the Fernald Environmental Restoration Management Corporation (FERMCO) has developed and implemented a Project Control System (PCS) that complies with requirements and provides DOE and FERMCO management with timely performance measurement information. To this extent, the FERMCO PCS probably is similar to the systems of the majority of the contractors in the DOE complex. In fact. this facet of the FERMCO PCS generally mirrors those used on projects around the world by FERMCO's parent company, Fluor Daniel. Starting with this "platform", the vision and challenge of creating a fully integrated system commenced. An open-architecture systems approach is the factor that most greatly influenced and enabled the successful development and implementation of the Project Control System for the Fernald Environmental Management Project. All aspects of a fully integrated system were considered during the design phase. The architecture of the FERMCO system enables seamless, near real-time, transfer of data both from and to the Project Control System with all other related systems. The primary systems that provide and share data with the Project Control System include those used by the Payroll, Accounting, Procurement, and Human Resources organizations. To enable data linking with these organizations, the resource codes were designed to map many-to-one from their detailed codes to the summarized codes used in the PCS.

9133 (IA–1486) **Research laboratories annual report 1993.** Israel Atomic Energy Commission, Tel Aviv (Israel). Aug 1994. 207p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

The 1993 annual report of the Israel Atomic Energy Commission presents, in brief and concise form, recent results and achievements of the well established program of the basic and applied research carried out by the scientists and engineers of the Israel Atomic Energy Commission in collaboration with colleagues at the other institutions in Israel and abroad. In terms of contents, the report presents the usual combination of topical basic applied research. Much of the work has been published or submitted for publication in the international scientific or technical literature. The main headings in the report are: theoretical physics and theoretical chemistry; optics and lasers; solid states and nuclear physics; materials sciences; chemistry; environmental studies and radiopharmaceuticals; radiation effects, dosimetry and radioprotection; and instrumentation and techniques.

9134 (IAEA-TECDOC–770) **International Centre for Theoretical Physics, Trieste. Scientific activities in 1993.** International Atomic Energy Agency, Vienna (Austria). Oct 1994. 152p. Order Number DE95613348. Source: OSTI; NTIS (US Sales Only); INIS.

The annual report of the International Centre for Theoretical Physics from Trieste for 1993 contains four parts. Part I gives statistical data on the main activities of the Centre. Part II presents the scientific programme structured as follows: Fundamental physics, Condensed matter physics, Mathematics, Physics and energy, Physics and environment, Physics of the living state, Applied physics, Adriatico Research Conferences, Diploma Course, Laboratories, Long-term visitors, Network of Associate Members and Federal Institutes, Training and research at italian laboratories, External Activities, Science, High Technology and Development Programme, Meeting hosted, Awards. Part III lists the publications issued in 1993. Part IV presents the scientific support services. Tabs.

9135 (INIS-mf–14437) **Instruction texts and problems for the training and examination of selected personnel at research nuclear facilities.** Bezpecnost Jadernych Zarizeni, no.4. Matejka, K. (ed.) (Ceske Vysoke Uceni Technicke, Prague (Czech Republic). Fakulta Jaderna a Fysikalne Inzenyrska); Fleischhans, J.; Hejzlar, R. No corporate text available. Jun 1994. 449p. (In Czech). Order Number DE95616238. Source: OSTI; NTIS (US Sales Only); INIS.

The publication comprises 6 separate brochures: (1) Selected chapters in reactor theory; (2) Experimental education methods; (3) Research and experimental reactors; (4.1) Technical description of the LVR-15 reactor; (4.2) Technical description of the LR-0 reactor; (4.3) Technical description of the VR-1 reactor; (5) Research reactor safety and operation; and (6) Database of problems for qualification examinations. Brochure No. 4 consists of 3 separate parts. The publication is intended for the training and examination of the following research reactor staff: reactor operator, shift engineer, control physicist, and start-up group head. (J.B.).

9136 (INIS-mf–14437-Vol.2) **Vol. 2: Experimental education methods.** Bezpecnost Jadernych Zarizeni, no.4. Matejka, K. (ed.) (Ceske Vysoke Uceni Technicke, Prague (Czech Republic). Fakulta Jaderna a Fysikalne Inzenyrska); Fleischhans, J.; Hejzlar, R. No corporate text available. Jun 1994. 449p. (In Czech). Order Number DE95616239. Source: OSTI; NTIS (US Sales Only); INIS.

Practical exercises to be performed at the VR-1 training reactor as a follow-up to lessons in reactor theory are described. The exercises include reactor start-up and operation, examination of the properties of neutron detectors for nuclear reactor control, delayed neutron measurement, reactivity measurement, rod calibration, the critical experiment, determination of the effect of various materials on reactor reactivity, thermal neutron flux density measurement, preparation of a photoneutron source and investigation of its properties, investigation of nuclear reactor dynamics, thermoluminescent dosimetry, decontamination of equipment and surfaces, testing the adjusted parameters of the control and protection system, measurement of the effect of a cavity on reactivity, and dosimetric measurements in the vicinity of the training reactor. (J.B.). 4 tabs., 18 figs.

9137 (JINR–94-62) **Report on activity of the Joint Institute for Nuclear Research.** Joint Inst. for Nuclear Research, Dubna (Russian Federation). 1994. 153p. (In Russian). Order Number DE95613349. Source: OSTI; NTIS (US Sales Only); INIS.

The structure of the JINR management boards is considered. The results of studies in the field of theoretical physics, high-energy physics and nuclear and neutron physics, as well as computers and automation designs are briefly summarized. The main results of the JINR participation in realization of the researches according to the international scientific cooperation programs are discussed. 330 refs.; 56 figs.; 8 tabs.

9138 (Juel–2950) **Progress report on nuclear data research in the Federal Republic of Germany for the period April**

1, 1993 to March 31, 1994. Qaim, S.M. (ed.). Forschungszentrum Juelich GmbH (Germany). Inst. fuer Chemie 1 - Nuklearchemie. Aug 1994. 69p. (NEA/NSC/DOC--94-21; INDC(GER)--039/LN). Order Number DE95738329. Source: OSTI; NTIS (US Sales Only); INIS.

In this volume is reported the work on measurement, compilation and evaluation of nuclear data for pure and applied programms, such as those relevant to fission- and fusion-reactor technology, radioactive waste management, accelerator shielding and development, astrophysics research, cosmogenic and meteoritic investigations, production of medically important radioisotopes, etc.

9139 (KAERI/RR--1197/92) **A study for developing training courses of the nuclear training center -with priority given to the training goals of KAERI-.** Kim, Yong (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Seo, In Seok; Kim, Deok In; Lee, Won Koo; Lee, Sueng Hee; Lee, Byoung Soen; Lee, Uei Jin; Kim, Young Joong; Oh, Sei Ki; Jeon, Hyong Ryon; Kim, Dong Soo; Lee, Han Young; Lee, Dong Jin.Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jan 1993. 119p. (In Korean). Order Number DE95613350. Source: OSTI; NTIS; INIS.

The final goal of this project, which covers 3 years (from 1992 to 1994), is to develop personnel training courses of the Korea Atomic Energy Research Institute (KAERI) and to derive the most desirable training system therefrom. To achieve this final goal successfully the first year's research was designed and has been carried on; firstly, to analyze the on-going issues and what kind of reform measures should be introduced to both the input and conversion processes of KAERI to efficiently achieve the organization goals, secondly, to derive personnel training goals of KAERI based on the analyses. First, this study introduced the viewpoint of systems approach for organization analysis, and defined that the productivity of an organization mainly depends on manpower quality of the input section and efficiency of the conversion process. Next, general organization theories and characteristics of research and development organization were studied, and derived that in research and development organization the expertise of a specialist should be regarded as the main value rather than his position, and the atmosphere should be human-centered, being free and democratic rather than authoritarian. And the study emphasizes more flatted structure of organization, necessity of sense of Management By Objectives (MBO), future planning capability, quality of manager with democratic leadership as criteria for the analysis of research and development organization. Finally, analyzing organization structure and behavior of KAERI based on the criteria, the study derived the ends-means hierarchy of personnel training of KAERI and discussed the necessity of organization reform of KAERI. (Author).

9140 (KAERI/RR--1203/92) **Analysis of the international environment for the national nuclear technology development in the post-coldwar era.** Yang, Maeng Ho (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Kim, Hwa Sup; Kim, Ji Whan; Lee, Dong Jin; Kim, Jong Sook; Kim, Hyun Joon; Yoon, Young Woo; Ham, Chul Hoon; Cho, Suck Hong. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Dec 1992. 156p. (In Korean). Order Number DE95613351. Source: OSTI; NTIS; INIS.

The main objective of this study is to suggest future policy directions of national nuclear technology development and to define the role of nuclear power in the post-coldwar era. This study first reviews how the collapse of USSR have exerted subsequent effects on the international nuclear industry and analyses the efforts of the multinational nuclear enterprises to obtain technological, competitiveness and to expand the share in the international nuclear market in order to compete the economical and technological superiority. Finally, this study analyses scenarios for the global environmental regulations which may be imposed over internationally in the near future. This study suggests; firstly, increasing investment on science and technology, secondly, diversifying international cooperation, thirdly, rearranging and strengthening a national system for information collecting and analysis, fourthly, making up infrastructure to expand the role of nuclear power, fifthly, expanding the applications of nuclear energy including district heating, etc. (Author).

9141 (KAERI/RR--1288/93) **A study on the establishment of national nuclear foreign policy -with reference to the strategy on the NPT extension and analysis of nuclear liability-.** Oh, Keun Bae (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Choi, Yeong Myeong; Ham, Chol Hoon; Lee, Kwang Seok; Lee, Byeong Uk; Lee, Jae Seong; Choi, Yeong Rok; Ko, Han Seok. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jan 1994. 187p. (In Korean). Order Number DE95613352. Source: OSTI; NTIS; INIS.

The overall objectives of this study are to analyze the international nuclear export control system and the international non-proliferation circumstance, to establish national strategies for the NPT extension, to suggest revisions of the IAEA Statute Article VI giving Korea permanent membership on the IAEA board of Governors, and to analyze and establish counter measurements for nuclear liability in verious fields. (Author).

9142 (KAERI/RR--1291/93) **Overall analysis of meteorological information in the Daeduk nuclear complex.** Kim, Byung Woo (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Lee, Young Bok; Han, Moon Hee; Kim, Eun Han; Suh, Kyung Suk; Hwang, Won Tae. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jan 1994. 134p. (In Korean). Order Number DE95613353. Source: OSTI; NTIS; INIS.

Inspection and repair of tower structure and lift, instrument calibration have been done with DAS (data aquisition system) updating. Wind direction, wind speed, temperature, humidity at 67m, 27m, and 10m height and temperature, humidity, atmospheric pressure, solar radiation, precipitation, and visibility at surface have been measured and analyzed with statistical methods. Wireless data transmission to MIPS (Meteorological Information Processing System) has been done after collection in the DAS where enviromental assessment can be done by the developed simulation programs in both cases of normal operation and emergency. The meteorological data as the result of this project had been used to report 'Environmental Impact Assessment of the Korean Multipurpose Research Reactor' and 'Site Selection of Meteorological Tower and Environment Impact Assessment of the Cooling Tower of the Korean Multi-purpose Research Reactor' (Author).

9143 (KAERI/RR--1298/93) **A study on the status of nuclear development and utilization in North Korea.** Choi, Young Myung (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Oh, Keun Bae; Lee, Kwang Seok; Ham, Cheol Hoon; Lee, Byeong Uk; Lee, Jae Seong; Choi, Yeong Rok; Ko, Han Seong. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jan 1994. 358p. (In Korean). Order Number DE95613354. Source: OSTI; NTIS; INIS.

The objective of this project is to propose strategies and tactics for nuclear cooperation between the South and the North in the perspective of the unification of the Korean Peninsula, based on proper and objective understanding of the status of nuclear development and utilization activities in North Korea, especially those for peaceful purposes. This study analyzes the nuclear development and utilization status of North Korea in terms of nuclear development history and policies, nuclear research and development, nuclear power generation, nuclear fuel cycle, production and uses of radiation and isotopes, manufacturing of equipment and components of nuclear power plants, and international nuclear cooperation. Based on the analysis, this study proposes basic directions for nuclear cooperation between South and North Korea. (Author).

9144 (KAERI/RR--1300/93) **The development of KAERI management information system (II) -The development of Time Sheet Management System-.** Kang, Sin Bok (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Kim, Yeong Taek; Park, Soo Jin; Ko, Yeong Cheol; Lee, Jong Bok; Han, Eun Sook; Kim, Hyeon Jeong. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jan 1994. 104p. (In Korean). Order Number DE95613355. Source: OSTI; NTIS; INIS.

The purpose of this report is to describe the work done for the development, operation and maintenance of Time Sheet Management System. This work is a part of the development KAERI

management information system. Manpower management is essential to cope with the external circumstances promptly and to maximize the productivity of the organization. This work aims at setting up a basis for the manpower management system. It is widely recognized that neither timely decision making nor competitive edge can be secured with the traditional management technology in so a rapidly changing situations home and abroad, which can be characterized by openness and informality. The necessity of efficient and scientific man-power management by time-study has emerged on the reorganization of KAERI by expanding matrix system in order to enhance the R and D productivity. (Author).

9145 (KAERI/RR–1339/93) **The development of human behaviour analysis techniques -The development of human factors technologies-.** Lee, Jung Woon (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Cheon, Se Woo; Shu, Sang Moon; Park, Geun Ok; Lee, Yong Hee; Lee, Han Yeong; Park, Jae Chang; Lee, Eu Jin; Lee, Seung Hee. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Apr 1994. 250p. (In Korean). Order Number DE95613356. Source: OSTI; NTIS; INIS.

This project has two major areas ; one is the development of an operator task simulation software and another is the development of human error analysis and application technologies. In this year project, the second year, for the development of an operator task simulation software, we studied the followings: - analysis of the characteristics of operator tasks, - development of operator task structures : Macro Structures, - development of an operator task simulation analyzes, - analysis of performance measures. And the followings for the development of human error analysis and application technologies : - analysis of human error mechanisms, - analysis of human error characteristics in tasks, - analysis of human error occurrence in Korean Nuclear Power Plants, - establishment of an experimental environment for human error data collection with Compact Nuclear Simulator, - basic design of a Multimedia-based Human Error Representing System. (Author).

9146 (KAERI/RR–1358/93) **A study on international nuclear cooperation and technology self-reliance strategies for nuclear development in other countries.** Choi, Young Myung (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Han, Pil Soon; Park, Yun Sik; Song, Ki Dong; Yang, Mang Ho; Oh, Keun Bae; Jang, Hong Lae; Lee, Dong Jin; Lee, Kang Suk; Kim, Sung Ki; Ko, Han Suk. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Dec 1993. 185p. (In Korean). Order Number DE95613357. Source: OSTI; NTIS; INIS.

This study deals with international nuclear cooperation and technology self-reliance for nuclear development in other countries. This study also analyses the international and domestic nuclear environment such as NPT, nuclear export control, gloval environmental issues, and public acceptance. Finally, a suggestion is made for the future direction of strategy for nuclear technology self-reliance in Korea. (Author).

9147 (LYCEN–9401) **INPL annual report 1992-1993.** Lyon-1 Univ., 69 - Villeurbanne (France). Inst. de Physique Nucleaire. 1994. 173p. (In French). Order Number DE95613358. Source: OSTI; NTIS (US Sales Only); INIS.

This report presents the experimental and technical activities of the Nuclear Physics Institute of Lyon (INPL) covering various topics such as: quarks and leptons, hadronic matter, hadrons and astroparticles, theoretical physics, ions/clusters-matter, modification/characterization of surface, R D and instrumentation, technical service activities, education and communication activities, thesis, publications, conferences, reports, seminars, organization and financial information. figs., refs.

9148 (NEI-SE–179) **Activity report. July 1993 - June 1994.** Linkoeping Univ. (Sweden). Dept. of Physics and Measurement Technology. Sep 1994. 209p. Order Number DE95613359. Source: OSTI; NTIS; INIS.

The Department of Physics and Measurement Technology, Biology and Chemistry (IFM) presents its 24th consecutive annual progress report. It contains a brief description of activities in research and education within the department. The report is intended as an information for colleagues and institutions. The present report contains activities for the academic year July 1993 to June 1994. IFM has been in operation for slightly more than two decades, and has during that time expanded quite substantially. The number of employees is around 270 including 110 graduate students. The number of papers accepted for publication or published in highly reputed international scientific journals is on a high level, which gives a good indication of the quality of research performed at IFM. IFM is also very active in education for undergraduates. Examples of such activities are given in our report. Almost 30% of the total budget is allocated to undergraduate educational programmes.

9149 (ORNL/TM–12868) **Technical Support Section annual work plan for FY 1995.** Adkisson, B.P.; Hess, R.A.; Kunselman, C.W.; Millet, A.J.; Smelcer, D.R. Oak Ridge National Lab., TN (United States). Oct 1994. 7p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE95004738. Source: OSTI; NTIS; GPO Dep.

The Technical Support Section (TSS) of the Instrumentation and Controls (I and C) Division of Oak Ridge National Laboratory (ORNL) provides technical services such as fabrication, modification, installation, calibration, operation, repair, and preventive maintenance of instruments and other related equipment. Work performed by TSS is in support of basic and applied research and development (R and D), engineering, and instrument and computer systems managed by ORNL. Because the activities and priorities of TSS must be adapted to the technical support needs of ORNL, the TSS Annual Work Plan is derived from and driven directly by current trends in the budgets and activities of each ORNL division for which TSS provides support. Trends that will affect TSS planning during this period are reductions in the staffing levels of some R and D programs because of attrition or budget cuts and the establishment of new facilities or environmental safety and health programs. The "Long-Range Work Plan" is based on estimates of impact of the long-range priorities and directions of the Laboratory. Identifiable proposed new facilities and programs provide additional basis for long-range planning. After identifying long-range initiatives, TSS planning includes future training requirements, reevaluation of qualifications for new-hires, and identification of essential test equipment needed in new work.

9150 (SAND–94-3122C) **Leadership – It's everybody's business.** Kane, A.J. Sandia National Labs., Albuquerque, NM (United States). [1994]. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. (CONF-9405270–1: 49. annual quality congress, Cincinnati, OH (United States), 22-24 May 1994). Order Number DE95004538. Source: OSTI; NTIS; GPO Dep.

In a time when many companies are trying to find a way to do more with less, they are missing the "solution" that is right before their eyes. Rather than trying to decide on whether to reengineer or process improve, they should be focused on their most valuable resource: people. This paper discusses the elements of leadership and how it applies to all individuals in an organization. To get outstanding results from people, they need to begin by making leadership everybody's business.

9151 (WHC-SD-TD-CSWD–002) **Workflow automation architecture standard.** Moshofsky, R.P. (Boeing Computer Services Co., Richland, WA (United States)); Rohen, W.T. Westinghouse Hanford Co., Richland, WA (United States); Boeing Computer Services Co., Richland, WA (United States). 14 Nov 1994. 66p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95004748. Source: OSTI; NTIS; GPO Dep.

This document presents an architectural standard for application of workflow automation technology. The standard includes a functional architecture, process for developing an automated workflow system for a work group, functional and collateral specifications for workflow automation, and results of a proof of concept prototype.

9152 (WHC-SP–1118) **Economic transition FY 1995 Multi-Year Program Plan (MYPP)/Fiscal Year Work Plan (FYWP) WBS 7.4.9.** Schwenk, R.M. Westinghouse Hanford Co., Richland, WA (United States). Sep 1994. 153p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. Order Number DE95004970. Source: OSTI; NTIS; GPO Dep.

The mission of the WHC Economic Transition Center is to support Hanford's cleanup mission and to leverage the assets of that mission to promote diversification and long-term sustainability of the regional economy and workforce. Conducting an economic transition program is imperative at sites such as Hanford, which are faced with transition from a defense production mission to a massive cleanup mission, followed by rampdown and site closure. At issue are the human and physical resources of the Site and the final disposition of those resources. Without an effective economic transition program, the federal government will have invested billions of dollars to achieve environmental regulatory compliance without generating any greater return on investment. With an effective economic transition program, the potential exists to redeploy the highly skilled, well-trained, and educated workforce developed and utilized during the Site's cleanup mission and find productive uses for land, facilities, and equipment. The Economic Transition Center has been divided into the following business areas: outsourcing; spinoffs; technology acquisition; technology transfer; conversion; and cross-cutting partnerships. A work package has been developed for each of these business areas in this Fiscal Year Work Plan.

9902 Mathematics and Computers

Refer also to citation(s) 7322, 7365, 7451, 7453, 7460, 7466, 7512, 7600, 7621, 7648, 7656, 7657, 7658, 7661, 7662, 7664, 7717, 7761, 7817, 8008, 8220, 8251, 8255, 8256, 8258, 8294, 8302, 8430, 8458, 8490, 8548, 8652, 8690, 8803, 8843, 8949

9153 (ANL/MCS/CP–85098) **Scalable, extensible, and portable numerical libraries.** Gropp, W. (Argonne National Lab., IL (United States)); Smith, B. Argonne National Lab., IL (United States). [1995]. 8p. Sponsored by USDOE, Washington, DC (United States);Department of Defense, Washington, DC (United States). DOE Contract W-31109-ENG-38. Contract ONR N0001492-J1890. (CONF-9310220–7: Institute of Electrical and Electronic Engineers (IEEE) meeting on scalable parallel libraries, Starkville, MS (United States), 6-8 Oct 1993). Order Number DE95004643. Source: OSTI; NTIS; GPO Dep.

Designing a scalable and portable numerical library requires consideration of many factors, including choice of parallel communication technology, data structures, and user interfaces. The PETSc library (Portable Extensible Tools for Scientific computing) makes use of modern software technology to provide a flexible and portable implementation. This talk will discuss the use of a metacommunication layer (allowing the user to choose different transport layers such as MPI, p4, pvm, or vendor-specific libraries) for portability, an aggressive data-structure-neutral implementation that minimizes dependence on particular data structures (even vectors), permitting the library to adapt to the user rather than the other way around, and the separation of implementation language from user-interface language. Examples are presented.

9154 (ANL/MCS-TM–198) **Users guide for the ANL IBM SP1.** Gropp, W.; Lusk, E.; Pieper, S.C. Argonne National Lab., IL (United States). Oct 1994. 41p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31-109-ENG-38. Order Number DE95005048. Source: OSTI; NTIS; GPO Dep.

This guide presents the features of the IBM SP1 installed in the Mathematics and Computer Science Division at Argonne National Laboratory. The guide describes the available hardware and software, access policies, and hints for using the system productively.

9155 (CNIC–00750, pp. 21-23) **CMUP2- a program for calculating neutron or charged particle induced reactions in energy range up to 50 MeV.** Cai Chonghai (Nankai Univ., TJ (China). Dept. of Physics); Shen Qingbiao. China Nuclear Information Centre, Beijing, BJ (China); Chinese Nuclear Data Center, Beijing, BJ (China). Jun 1993. (CNDC–0012; INDC(CPR)–030/L.). In *Communication of nuclear data progress: No.9 (1993).* 113p. Order Number DE95613323. Source: OSTI; NTIS (US Sales Only); INIS.

CMUP2 is a program for calculating the neutron or charged particles (p, d, t, ^{3}He, α) induced reactions on medium-heavy nuclei in the incident energy range of 1 $\approx$ 50 MeV. The output data of this program include cross sections, elastic scattering angular distribution and the ratio of the elastic scattering differential cross section to the Rutherford differential cross section and energy spectra of all secondary particle. CMUP2 has been used to calculate reactions of : P + ^{89}Y, P + ^{63}Cu, n + ^{56}Fe. Pretty good results in agreement with the experimental data were obtained.

9156 (CNIC–00750, pp. 23-24) **CFUP1- a program for calculating neutron or charged particle induced reactions on fissile nuclei in energy range up to 35 MeV.** Cai Chonghai (Nankai Univ., TJ (China). Dept. of Physics); Shen Qingbiao. China Nuclear Information Centre, Beijing, BJ (China); Chinese Nuclear Data Center, Beijing, BJ (China). Jun 1993. (CNDC–0012; INDC(CPR)–030/L.). In *Communication of nuclear data progress: No.9 (1993).* 113p. Order Number DE95613323. Source: OSTI; NTIS (US Sales Only); INIS.

CFUP1 is a program for calculating the neutron or charged particles (p, d, t, ^{3}He, α) induced reactions on fissile nuclei in the incident energy range of 1 $\approx$ 35 MeV. The output data of CFUP1 include: cross sections and γ values; elastic scattering angular distributions; and the ratios of the elastic scattering differential cross section to Rutherford scattering differential cross section; energy spectra of all secondary particle and energy spectra of various fission processes. CFUP1 has been used to calculate several reactions of P + ^{235}U, P + ^{241}Am, n + ^{240}Pu. Pretty good results in agreement with the experimental data were obtained.

9157 (CNIC–00750, pp. 73-75) **Computer program library at CNDC.** Liu Ruizhe (Chinese Nuclear Data Center, Beijing, BJ (China)); Sun Naihong; Zhang Limin. China Nuclear Information Centre, Beijing, BJ (China); Chinese Nuclear Data Center, Beijing, BJ (China). Jun 1993. (CNDC–0012; INDC(CPR)–030/L.). In *Communication of nuclear data progress: No.9 (1993).* 113p. Order Number DE95613323. Source: OSTI; NTIS (US Sales Only); INIS.

In order to meet the needs of nuclear data calculation and nuclear energy application, computer program library (CPL) at CNDC was set up in 1989. The construction purpose and collecting fields of CPL, the judgment and category of the codes accepted by CPL are introduced. The quality of these codes are evaluated.

9158 (CNIC–00750, pp. 78-89) **Covariance data evaluation for experimental data.** Liu Tingjin (Chinese Nuclear Data Center, Beijing, BJ (China)). China Nuclear Information Centre, Beijing, BJ (China); Chinese Nuclear Data Center, Beijing, BJ (China). Jun 1993. (CNDC–0012; INDC(CPR)–030/L.). In *Communication of nuclear data progress: No.9 (1993).* 113p. Order Number DE95613323. Source: OSTI; NTIS (US Sales Only); INIS.

Some methods and codes have been developed and utilized for covariance data evaluation of experimental data, including parameter analysis, physical analysis, Spline fitting etc.. These methods and codes can be used in many different cases.

9159 (CNIC–00750, pp. 90-98) **Several examples of least squares combination for derived data.** Zhao Zhixiang (Chinese Nuclear Data Center, Beijing, BJ (China)). China Nuclear Information Centre, Beijing, BJ (China); Chinese Nuclear Data Center, Beijing, BJ (China). Jun 1993. (CNDC–0012; INDC(CPR)–030/L.). In *Communication of nuclear data progress: No.9 (1993).* 113p. Order Number DE95613323. Source: OSTI; NTIS (US Sales Only); INIS.

Three examples including Peelle's example for the combination of the derived data are calculated by using the formalism given by Perel et al. The details of calculation are presented. From the computational results it would be clear that Perel's formalism only work in the linear situation.

9160 (CONF-9410141–6) **CD-ROM in the age of internet.** Conrad, B.; Depp, D. Oak Ridge National Lab., TN (United States). [1994]. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. From Office of Scientific and Technical Information INFOTECH '94; Oak Ridge, TN (United States); 25-26 Oct 1994. Order Number DE95005067. Source: OSTI; NTIS; GPO Dep.

Networks are hot and CD-ROM is also hot, but how do they mix? CD-ROM is a relatively inexpensive medium for storing and delivering information, and increasingly, users are connected to

networks. But the technologies have developed separately, and there are obstacles to their integration. Drawing on their experience networking CD-ROMs at Oak Ridge National Laboratory, the authors discuss CD-ROM's strengths and weaknesses as a technology for delivering information to the desktop. CD-ROM networking solutions are LAN-based, not "open systems." Despite this limitation, due to the large number of information resources available on CD-ROM and the relative ease of installing and maintaining databases on CD-ROM, CD-ROMs remain an essential piece of the electronic information puzzle.

9161 (DOE/ER/25052–4) **NYU Ultracomputer project. Final project summary, 1979-1993.** Gottlieb, A. New York Univ., NY (United States). Courant Inst. of Mathematical Sciences. Oct 1994. 19p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-88ER25052. Order Number DE95005665. Source: OSTI; NTIS; GPO Dep.

This report discusses the following on the Ultracomputer project: simulation studies; network analysis; prototype hardware; VSLI design; coordination algorithms; systems software; application software; and compiler development.

9162 (DOE/ER/25199–T1) **Linear non-modal phenomena in numerical analysis and applied mathematics. First annual performance report, February 15, 1994–November 15, 1994.** Trefethen, L.N. Cornell Univ., Ithaca, NY (United States). Dept. of Computer Science. 14 Nov 1994. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG02-94ER25199. Order Number DE95005495. Source: OSTI; NTIS; GPO Dep.

This report contains information on the following topics: pseudospectra of an operator of Hille and Phillips; Schwarz- Christoffel toolbox user's guide; a matlab toolbox for Schwarz- Christoffel mapping; spectra and pseudospectra for pipe poiseuille flow; faster SVD for matrices with small m/n; calculation of pseudospectra by the Arnoldi iteration; and mostly linear model of transition to turbulence.

9163 (DOE/ER/40879–T1) **A report: A plan to establish Internet access points at Minority Campus sites for connection to a central computing facility.** Prairie View A and M Univ., TX (United States). 31 Oct 1994. 64p. Sponsored by USDOE, Washington, DC (United States). DOE Contract FG05-94ER40879. Order Number DE95004374. Source: OSTI; NTIS; GPO Dep.

In 1989, as the SSC was just getting under way, many of the HBCU/MIs experienced deep research and communications infrastructure problems as they attempted to find the necessary resources to link through the Internet to the Central Facility at the Superconducting Super Collider Laboratory (SSCL). The Internet was to many of the minority universities indeed a new and vital research support and information retrieval tool. Many minority researchers were unable to capitalize on these newly formed and rapidly evolving SSC projects. It was not necessarily because of heavy teaching loads alone but more because of a lack of resources and an academic infrastructure that could not generate the needed resources. Federal research dollars are most difficult to come by in an environment like this. We have learned over the years and across several minority institutions that internecine feuding between academic and administrative units, coupled with both physical and social isolation, are in part responsible for the weak rate of evolution at most minority institutions as compared with majority universities of comparable size and mission. The Tuples concept was a way to increase the minority researcher's productivity.

9164 (IFVE-OMVT–92-44) **New informative techniques in high energy physics.** Klimenko, S.V.; Ukhov, V.I. Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov (Russian Federation). Inst. Fiziki Vysokikh Ehnergij. 1992. 24p. (In Russian). Order Number DE95613202. Source: OSTI; NTIS (US Sales Only); INIS.

A number of new informative techniques applied to high energy physics are considered. These are the object-oriented programming, systems integration, UIMS, visualisation, expert systems, neural networks. 100 refs.

9165 (INIS-mf–14435) **The mining Pribram in science and technology. Section MC: Mathematical methods in geology.** Nemec, V.; Jezek, J.; Schejbal, C.; Szabo, S.; Silar, J.; Timcak, G.M. (eds.). No corporate text available. Oct 1993. [100p.] (In Czech). (CONF-9310403–: The mining Pribram in science and technology, Pribram (Czech Republic), 13-16 Oct 1993). Order Number DE95613232. Source: OSTI; NTIS (US Sales Only); INIS.

The proceedings contain 10 contributions, out of which 1 has been inputted in INIS; it deals with the application of multicriterial decision-making in nuclear power. (J.B.).

9166 (JINR-R–10-94-300) **Algorithms for Events Selection in the Vertex Detector of the MPS Spectrometer.** Ivanov, V.V. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation); Puzynin, I.V.; Purehvdorzh, B.; Poroshin, N.O. Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Computing Techniques and Automation. 1994. 10p. (In Russian). Order Number DE95613324. Source: OSTI; NTIS (US Sales Only); INIS.

Submitted to Matematicheskoe Modelirovanie.

With Monte Carlo generated model data the algorithms for B-meson events recognition based on the information concerning the trajectories of secondary particles registered in the vertex detector of the multiparticle spectrometer (MPS) were investigated. It was shown that selection of events at first by their multiplicity and after that their classification in the space of effective variables with the help of the multilayer perception permits to suppress the background approximately in 40 times. (author). 10 refs., 5 figs.

9167 (KAERI/RR–1205/92) **The development of KAERI management information system -First year: The development of manpower information management system-.** Kang, Shin Bok (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Huh, Young Hwan; Lee, Jong Bok; Park, Soo Jin; Lee, Young Jae; Park, Yeon Sik; Jang, Deok Kyu; Park, Seung Deok; Kim, Jong Myeong. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Dec 1991. 130p. (In Korean). Order Number DE95613325. Source: OSTI; NTIS; INIS.

The purpose of this report is to describe the implementation of the management information system for manpower. This job is the first year's for development KAERI management information system. It is important to properly manage a manpower to cope with the external circumstances promptly and to maximize the productivity of the organization. This report aims at basic management of manpower and uses multimedia to keep abreast with the times and introduces the concept of GUI (Graphic User Interface) to user for ease access. (Author).

9168 (KAERI/RR–1287/93) **Nuclear data evaluation and group constant generation for reactor analysis.** Kim, Jung Do (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Gil, Choong Sup. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Dec 1993. 86p. (In Korean). Order Number DE95613321. Source: OSTI; NTIS; INIS.

In nuclear or shielding design analysis for reactors including nuclear facilities, nuclear data are one of the primary importances. Research project for nuclear data evaluation and their effective applications has been continuously performed. The objectives of this project are (1) to compile the latest evaluated nuclear data files, (2) to establish their processing code systems, and (3) to evaluate the multigroup constant library using the newly compiled data files and the code systems. As the results of this project, JEF-2.2 which is latest version of Joint Evaluated File developed at OECD/NEA was compiled and COMPLOT and EVALPLOT utility codes were installed in personal computer, which are able to draw ENDF/B-formatted nuclear data for comparison and check. Computer system (NJOY/ACER) for generating continuous energy Monte Carlo code MCNP library was established and the system was validated by analyzing a number of experimental data. (Author).

9169 (KAERI/RR–1313/93) **The development of nuclear plant analysis code TASS (Transients and setpoints simulation).** Chang, Won Pyo (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Chang, Jong Hwa; Sim, Seok Koo; Kim, Hee Cheol; Han, Do Hee; Kim, Kyeong Doo; Lee, Seong Jae; Ha, Kyui Seok; Eum, Kil Seop; Yoon, Han Yeong; Kim, Doo Il. Korea Cancer

Center Hospital, Seoul (Korea, Republic of). Jul 1994. 241p. (In Korean). Order Number DE95613326. Source: OSTI; NTIS; INIS.

This study aims at development of the best-estimate system analysis code, which shall be applied generally to performance analysis, guide for operating procedures, accident management, and Non-LOCA analysis. In this year, both examination of the characteristics of TASS1.0 and its verification/validation on the design basis accidents have been carried out. One-dimensional kinetics model has been developed for core reactivity and a steam generator model has been also developed using a moving boundary between boiling and subcooled zone in the riser. The calculational results of TASS1.0 comparing with those of RELAP5/MOD3 have shown unrealistic behaviors of pressurizer and break flow. Inconsistancy among governing equations in the SG model also have been found. In next year, the development of TASS2.0 should take into account of improvements on the identified problems. (Author).

9170 (KAERI/RR–1330/93) **Development of accident management technology and computer codes -A study for nuclear safety improvement-.** Park, Chang Kyu (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Jae, Moo Sung; Jo, Young Gyun; Park, Rae Jun; Kim, Jae Hwan; Ha, Jae Ju; Kang, Dae Il; Choi, Sun Young; Kim, Si Hwan. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jul 1994. 230p. (In Korean). Order Number DE95613322. Source: OSTI; NTIS; INIS.

We have surveyed new technologies and research results for the accident management of nuclear power plants. And, based on the concept of using the existing plant capabilities for accident management, both in-vessel and ex-vessel strategies were identified and analyzed. When assessing accident management strategies, their effectiveness, adverse effects, and their feasibility must be considered. We have developed a framework for assessing the strategies with these factors in mind. We have applied the developed framework to assessing the strategies, including the likelihood that the operator correctly diagnoses the situation and successfully implements the strategies. Finally, the cavity flooding strategy was assessed by applying it to the station blackout sequence, which have been identified as one of the major contributors to risk at the reference plant. The thermohydraulic analyses with sensitivity calculations have been performed using MAAP 4 computer code. (Author).

9171 (KAERI/RR–1333/93) **Improvement of Level-1 PSA computer code package -A study for nuclear safety improvement-.** Park, Chang Kyu (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Kim, Tae Woon; Ha, Jae Joo; Han, Sang Hoon; Cho, Yeong Kyun; Jeong, Won Dae; Jang, Seung Cheol; Choi, Young; Seong, Tae Yong; Kang, Dae Il; Hwang, Mi Jeong; Choi, Seon Yeong; AnKorea Cancer Center Hospital, Seoul (Korea, Republic of). Jul 1994. [450p.] (In Korean). Order Number DE95613328. Source: OSTI; NTIS; INIS.

This year is the second year of the Government-sponsored Mid- and Long-Term Nuclear Power Technology Development Project. The scope of this subproject titled on 'The Improvement of Level-1 PSA Computer Codes' is divided into three main activities : (1) Methodology development on the under-developed fields such as risk assessment technology for plant shutdown and external events, (2) Computer code package development for Level-1 PSA, (3) Applications of new technologies to reactor safety assessment. At first, in the area of PSA methodology development, foreign PSA reports on shutdown and external events have been reviewed and various PSA methodologies have been compared. Level-1 PSA code KIRAP and CCF analysis code COCOA are converted from KOS to Windows. Human reliability database has been also established in this year. In the area of new technology applications, fuzzy set theory and entropy theory are used to estimate component life and to develop a new measure of uncertainty importance. Finally, in the field of application study of PSA technique to reactor regulation, a strategic study to develop a dynamic risk management tool PEPSI and the determination of inspection and test priority of motor operated valves based on risk importance worths have been studied. (Author).

9172 (KAERI/RR–1335/93) **The development of a severe accident analysis code -Research on the improvement of nuclear safety-.** Kim, Hee Dong (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Cho, Song Won; Park, Jong Hwa; Hong, Seong Wan; Yu, Dong Han. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Jul 1994. 335p. (In Korean). Order Number DE95613329. Source: OSTI; NTIS; INIS.

For prevention and mitigation of the containment failure during severe accident, the study is focused on the severe accident phenomena, especially, the ones occurring inside the cavity and is intended to improve existing models and develop analytical tools for the assessment of severe accidents. The natural circulation models in the MAAP and MELCOR were compared and the limitation and differences of these codes were investigated. The calculation of the local hydrogen concentration distribution in Ulchin 3, 4 containment was performed as part of hydrogen combustion study and the flame velocity model was examined. Explosive Fuel-Coolant Interaction, i.e. steam explosion model was reviewed and a debris entrainment model was investigated. Through international program of PHEBUS-FP and participation in the software development, sensitivity study for the oxidation model of the ICARE2 code was performed. CONTAIN and MELCOR codes were continuously updated under the cooperation with USNRC and problem areas of the code were reported through the MCAP program. (Author).

9173 (KFKI–1994-09/M-N) **Technology and applications.** Bogdany, J.; Vesztergombi, G. (eds.). Hungarian Academy of Sciences, Budapest (Hungary). Central Research Inst. for Physics. Jul 1994. 124p. (CONF-9402123–: Workshop on parallel processing, Budapest (Hungary), 10-11 Feb 1994). Order Number DE95613330. Source: OSTI; NTIS (US Sales Only); INIS.

The workshop on Parallel Processing, Technology and Applications, held February 10-11, Budapest, Hungary, covered a variety of topics on computer data processing and parallel computing. One of the 17 presentations discussed the need for massively parallel processing in support of future high energy experiments.

9174 (KFKI–1994-09/M-N, pp. 11-22) **Massively Parallel Processing. A need for future High Energy Physics experiments.** Rohrbach, F. (European Organization for Nuclear Research, Geneva (Switzerland)); Vesztergombi, G. Hungarian Academy of Sciences, Budapest (Hungary). Central Research Inst. for Physics. Jul 1994. (CONF-9402123–: Workshop on parallel processing, Budapest (Hungary), 10-11 Feb 1994). In *Technology and applications.* 124p. Order Number DE95613330. Source: OSTI; NTIS (US Sales Only); INIS.

In High Energy Physics, for the hadron colliders of the future there will be a strong need for real time sophisticated triggering systems.For this purpose, an ambitious project of a Single/Multiple Instruction Multiple Data architecture is described.The MPPC Project (Massively Parallel Processing Collaboration) concentrated its effort on the development and applications of a 16K-processor machine based on the ASP concept (Associative String Processor architecture). A prototype is now working: it is called ASTRA. A friendly software environment has been implemented to make the ASTRA machine now installed at CERN easy to use in actual application. (R.P.) 27 refs.; 4 fig.

9175 (KTH-ALF-R–94-1) **SALOME. Software for the analysis of lines or multiplets from Extrap. User's guide.** Zastrow, K.D. (Royal Inst. of Tech., Stockholm (Sweden). Dept. of Physics). Royal Inst. of Tech., Stockholm (Sweden). Dept. of Fusion Plasma Physics. [1994]. 67p. (TRITA-ALF–94-1.). Order Number DE95613331. Source: OSTI; NTIS; INIS.

This user's guide describes the centre piece of spectral analysis programs for Extrap-T1. The method for spectral analysis is presented theoretically. It also presents the actual use of the program PROBESCHUSS and how to work on the multiplet library. The present user's guide is about PROBESCHUSS 2.1 and MULTIFIT 2.0. 7 figs, 5 appendices.

9176 (LA-UR–94-1947) **User's guide and physics manual for the SCATPlus circuit code.** Yapuncich, M.L.; Deninger, W.J.; Gribble, R.F. Los Alamos National Lab., NM (United States). 9 May 1994. 120p. Sponsored by Department of Defense, Washington, DC (United States). DOE Contract W-7405-ENG-36. Order Number DE95003755. Source: OSTI; NTIS; GPO Dep.

ScatPlus is a user friendly circuit code and an expandable library of circuit models for electrical components and devices; it can be

used to predict the transient behavior in electric circuits. The heart of ScatPlus is the transient circuit solver SCAT written in 1986 by R.F. Gribble. This manual includes system requirements, physics manual, ScatPlus component library, tutorial, ScatPlus screen, menus and toolbar, ScatPlus tool bar, procedures.

9177 (LA-UR–94-4339) **A practical approach to portability and performance problems on massively parallel supercomputers.** Beazley, D.M. (Utah Univ., Salt Lake City, UT (United States). Dept. of Computer Science); Lomdahl, P.S. Los Alamos National Lab., NM (United States). 8 Dec 1994. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9410291–1: Performance tuning for parallel computing systems, Cape Cod, MA (United States), 3-5 Oct 1994). Order Number DE95005251. Source: OSTI; NTIS; GPO Dep.

We present an overview of the tactics we have used to achieve a high-level of performance while improving portability for a large-scale molecular dynamics code SPaSM. SPaSM was originally implemented in ANSI C with message passing for the Connection Machine 5 (CM-5). In 1993, SPaSM was selected as one of the winners in the IEEE Gordon Bell Prize competition for sustaining 50 Gflops on the 1024 node CM-5 at Los Alamos National Laboratory. Achieving this performance on the CM-5 required rewriting critical sections of code in CDPEAC assembler language. In addition, the code made extensive use of CM-5 parallel I/O and the CMMD message passing library. Given this highly specialized implementation, we describe how we have ported the code to the Cray T3D and high performance workstations. In addition we will describe how it has been possible to do this using a single version of source code that runs on all three platforms without sacrificing any performance. Sound too good to be true? We hope to demonstrate that one can realize both code performance and portability without relying on the latest and greatest prepackaged tool or parallelizing compiler.

9178 (LA-UR–94-4382) **The geometry of weak solutions of certain integrable nonlinar PDE's.** Alber, M.S. (Notre Dame Univ., IN (United States)); Camassa, R.; Holm, D.D.; Marsden, J.E. Los Alamos National Lab., NM (United States). [1994]. 6p. Sponsored by USDOE, Washington, DC (United States);Department of Defense, Washington, DC (United States). DOE Contract W-7405-ENG-36. (CONF-9409241–5: NEEDS '94, Los Alamos, NM (United States), 12-16 Sep 1994). Order Number DE95005241. Source: OSTI; NTIS; GPO Dep.

We investigate the geometry of new classes of soliton-like weak solutions for integrable nonlinear equations. One example is the class of peakons introduced by Camassa and Holm [1993] for their integrable shallow water equation. Alber, Camassa, Holm and Marsden [1994a] put this shallow water equation into the framework of complex integrable Hamiltonian systems on Riemann surfaces and use special limiting procedures to obtain new solutions such as quasiperiodic solutions, n-solitons, solitons with quasiperiodic background, billiard, and n-peakon solutions and complex angle representations for them. They also obtain explicit formulas for phase shifts of interacting soliton solutions using the method of asymptotic reduction of the corresponding angle representations. The method they use for the shallow water equation also leads to a link between one of the members of the Dym hierarchy and geodesic flow on N-dimensional quadrics. Amongst these geodesics, particularly interesting ones are the umbilic geodesics, which generate the class of umbilic soliton solutions. Umbilic solitons have the property that as the space variable x tends to infinity, the solution tends to a periodic wave, and as x tends to minus infinity, it tends to the same periodic wave with a phase shift. Elliptic billiards may be obtained from the problem of geodesics on quadrics by collapsing along the shortest semiaxis. The corresponding Hamiltonian billiard flows axe associated to new classes of solutions of equations in the Dym hierarchy. Such billiard type solutions have discontinuous spatial derivative and, thus, are weak solutions for this class of PDE's.

9179 (LBL–35179) **Dynamics of TCP traffic over ATM networks.** Floyd, S. (Lawrence Berkeley Lab., CA (United States). Information and Computing Sciences Div.); Romanow, A. Lawrence Berkeley Lab., CA (United States). Aug 1994. 10p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00098. (CONF-9408202–1: SIGCOMM 1994 conference, London (United Kingdom), 27 Aug - 4 sep 1994). Order Number DE95004687. Source: OSTI; NTIS; GPO Dep.

The authors investigate the performance of TCP (Transport Control Protocol) connections over ATM (Asynchronous Transfer Mode) networks without ATM-level congestion control, and compare it to the performance of TCP over packet-based networks. For simulations of congested networks, the effective throughput of TCP over ATM can be quite low when cells are dropped at the congested ATM switch. The low throughput is due to wasted bandwidth as the congested link transmits cells from "corrupted" packets, i.e., packets in which at least one cell is dropped by the switch. This fragmentation effect can be corrected and high throughput can be achieved if the switch drops whole packets prior to buffer overflow; they call this strategy Early Packet Discard. They also discuss general issues of congestion avoidance for best-effort traffic in ATM networks.

9180 (LBL–35238) **Wide-area traffic: The failure of Poisson modeling.** Paxson, V.; Floyd, S. Lawrence Berkeley Lab., CA (United States). Aug 1994. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00098. (CONF-9408202–2: SIGCOMM 1994 conference, London (United Kingdom), 27 Aug - 4 sep 1994). Order Number DE95004685. Source: OSTI; NTIS; GPO Dep.

Network arrivals are often modeled as Poisson processes for analytic simplicity, even though a number of traffic studies have shown that packet interarrivals are not exponentially distributed. The authors evaluate 21 wide-area traces, investigating a number of wide-area TCP arrival processes (session and connection arrivals, FTPDATA connection arrivals within FTP sessions, and TELNET packet arrivals) to determine the error introduced by modeling them using Poisson processes. The authors find that user-initiated TCP session arrivals, such as remote-login and file-transfer, are well-modeled as Poisson processes with fixed hourly rates, but that other connection arrivals deviate considerably from Poisson; that modeling TELNET packet interarrivals as exponential grievously underestimates the burstiness of TELNET traffic, but using the empirical Tcplib[DJCME92] interarrivals preserves burstiness over many time scales; and that FTPDATA connection arrivals within FTP sessions come bunched into "connection bursts", the largest of which are so large that they completely dominate FTPDATA traffic. Finally, they offer some preliminary results regarding how the findings relate to the possible self-similarity of wide-area traffic.

9181 (ORNL/TM–12744) **DOLIB: Distributed Object Library.** D'Azevedo, E.F.; Romine, C.H. Oak Ridge National Lab., TN (United States). Oct 1994. 49p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE95004791. Source: OSTI; NTIS; GPO Dep.

This report describes the use and implementation of DOLIB (Distributed Object Library), a library of routines that emulates global or virtual shared memory on Intel multiprocessor systems. Access to a distributed global array is through explicit calls to gather and scatter. Advantages of using DOLIB include: dynamic allocation and freeing of huge (gigabyte) distributed arrays, both C and FORTRAN callable interfaces, and the ability to mix shared-memory and message-passing programming models for ease of use and optimal performance. DOLIB is independent of language and compiler extensions and requires no special operating system support. DOLIB also supports automatic caching of read-only data for high performance. The virtual shared memory support provided in DOLIB is well suited for implementing Lagrangian particle tracking techniques. We have also used DOLIB to create DONIO (Distributed Object Network I/O Library), which obtains over a 10-fold improvement in disk I/O performance on the Intel Paragon.

9182 (ORNL/TM–12852) **A note on the total least squares problem for coplanar points.** Lee, S.L. Oak Ridge National Lab., TN (United States). Sep 1994. 14p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE95004876. Source: OSTI; NTIS; GPO Dep.

The Total Least Squares (TLS) fit to the points (x_k, y_k), $k = 1, \cdots, n$, minimizes the sum of the squares of the perpendicular distances from the points to the line. This sum is the TLS error, and minimizing its magnitude is appropriate if x_k and y_k are uncertain. A priori formulas for the TLS fit and TLS error to coplanar points

were originally derived by Pearson, and they are expressed in terms of the mean, standard deviation and correlation coefficient of the data. In this note, these TLS formulas are derived in a more elementary fashion. The TLS fit is obtained via the ordinary least squares problem and the algebraic properties of complex numbers. The TLS error is formulated in terms of the triangle inequality for complex numbers.

9183 (ORNL/TM–12853) **Bounds for departure from normality and the Frobenius norm of matrix eigenvalues.** Lee, S.L. Oak Ridge National Lab., TN (United States). Dec 1994. 22p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. Order Number DE95006144. Source: OSTI; NTIS; GPO Dep.

New lower and upper bounds for the departure from normality and the Frobenius norm of the eigenvalues of a matrix axe given. The significant properties of these bounds axe also described. For example, the upper bound for matrix eigenvalues improves upon the one derived by Kress, de Vries and Wegmann in [Lin. Alg. Appl., 8 (1974), pp. 109-120]. The upper bound for departure from normality is sharp for any matrix whose eigenvalues are collinear in the complex plane. Moreover, the latter formula is a practical estimate that costs (at most) 2m multiplications, where m is the number of nonzeros in the matrix. In terms of applications, the results can be used to bound from above the sensitivity of eigenvalues to matrix perturbations or bound from below the condition number of the eigenbasis of a matrix.

9184 (PNL–10382) **Final report and recommendations of the ESnet Authentication Pilot Project.** Johnson, G.R. (Pacific Northwest Lab., Richland, WA (United States)); Moore, J.P.; Athey, C.L.; Engert, D.E.; Ramus, J.E. Pacific Northwest Lab., Richland, WA (United States). Jan 1995. 49p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. Order Number DE95005755. Source: OSTI; NTIS; GPO Dep.

To conduct their work, U.S. Department of Energy (DOE) researchers require access to a wide range of computing systems and information resources outside of their respective laboratories. Electronically communicating with peers using the global Internet has become a necessity to effective collaboration with university, industrial, and other government partners. DOE's Energy Sciences Network (ESnet) needs to be engineered to facilitate this "collaboratory" while ensuring the protection of government computing resources from unauthorized use. Sensitive information and intellectual properties must be protected from unauthorized disclosure, modification, or destruction. In August 1993, DOE funded four ESnet sites (Argonne National Laboratory, Lawrence Livermore National Laboratory, the National Energy Research Supercomputer Center, and Pacific Northwest Laboratory) to begin implementing and evaluating authenticated ESnet services using the advanced Kerberos Version 5. The purpose of this project was to identify, understand, and resolve the technical, procedural, cultural, and policy issues surrounding peer-to-peer authentication in an inter-organization internet. The investigators have concluded that, with certain conditions, Kerberos Version 5 is a suitable technology to enable ESnet users to freely share resources and information without compromising the integrity of their systems and data. The pilot project has demonstrated that Kerberos Version 5 is capable of supporting trusted third-party authentication across an inter-organization internet and that Kerberos Version 5 would be practical to implement across the ESnet community within the U.S. The investigators made several modifications to the Kerberos Version 5 system that are necessary for operation in the current Internet environment and have documented other technical shortcomings that must be addressed before large-scale deployment is attempted.

9185 (PNL-SA–23824) **Computer support for cooperative tasks in Mission Operations Centers.** Fox, J. (Pacific Northwest Lab., Richland, WA (United States)); Moore, M. Pacific Northwest Lab., Richland, WA (United States). Oct 1994. 12p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-941070–2: Computer supported cooperative symposium, Chapel Hill, NC (United States), 22-26 Oct 1994). Order Number DE95004928. Source: OSTI; NTIS; GPO Dep.

Traditionally, spacecraft management has been performed by fixed teams of operators in Mission Operations Centers. The team cooperatively (1) ensures that payload(s) on spacecraft perform their work and (2) maintains the health and safety of the spacecraft through commanding and monitoring the spacecraft's subsystems. In the future, the task demands will increase and overload the operators. This paper describes the traditional spacecraft management environment and describes a new concept in which groupware will be used to create a Virtual Mission Operations Center. Groupware tools will be used to better utilize available resources through increased automation and dynamic sharing of personnel among missions.

9186 (PNL-SA–25031) **Object-oriented parallel polygon rendering.** Heiland, R.W. Pacific Northwest Lab., Richland, WA (United States). Sep 1994. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-76RL01830. (CONF-9409278–3: GVIS '94: graphics and visualization conference, Richland, WA (United States), 8 Sep 1994). Order Number DE95004909. Source: OSTI; NTIS; GPO Dep.

Since many scientific datasets can be visualized using some polygonal representation, a polygon renderer has broad use for scientific visualization. With today's high performance computing applications producing very large datasets, a parallel polygon renderer is a necessary tool for keeping the compute-visualize cycle at a minimum. This paper presents a DOIV on renderer that combines the shared-memory and message-passing models of parallel programming. It uses the Global Arrays library, a shared-memory programming toolkit for distributed memory machines. The experience of using an object oriented approach for software design and development is also discussed.

9187 (SLAC-PUB–6567) **Adventures in the evolution of a high-bandwidth network for central servers.** Swartz, K.L.; Cottrell, L.; Dart, M. Stanford Linear Accelerator Center, Menlo Park, CA (United States). Aug 1994. 8p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC03-76SF00515. (CONF-9409186–2: 8. system administration conference, San Diego, CA (United States), 21-23 Sep 1994). Order Number DE95006215. Source: OSTI; NTIS; INIS; GPO Dep.

In a small network, clients and servers may all be connected to a single Ethernet without significant performance concerns. As the number of clients on a network grows, the necessity of splitting the network into multiple sub-networks, each with a manageable number of clients, becomes clear. Less obvious is what to do with the servers. Group file servers on subnets and multihomed servers offer only partial solutions – many other types of servers do not lend themselves to a decentralized model, and tend to collect on another, well-connected but overloaded Ethernet. The higher speed of FDDI seems to offer an easy solution, but in practice both expense and interoperability problems render FDDI a poor choice. Ethernet switches appear to permit cheaper and more reliable networking to the servers while providing an aggregate network bandwidth greater than a simple Ethernet. This paper studies the evolution of the server networks at SLAC. Difficulties encountered in the deployment of FDDI are described, as are the tools and techniques used to characterize the traffic patterns on the server network. Performance of Ethernet, FDDI, and switched Ethernet networks is analyzed, as are reliability and maintainability issues for these alternatives. The motivations for re-designing the SLAC general server network to use a switched Ethernet instead of FDDI are described, as are the reasons for choosing FDDI for the farm and firewall networks at SLAC. Guidelines are developed which may help in making this choice for other networks.

9903 Information Handling

Refer also to citation(s) 7287, 7380, 7415, 7503, 7622, 7875, 7909, 8349, 8417, 8553, 9052, 9160

9188 (ANL/DIS/CP–84374) **Raising the IQ in full-text searching via intelligent querying.** Kero, R. (Argonne National Lab., IL (United States)); Russell, L.; Swietlik, C.; Morgan, C.; Clayton, C.; Dunlap, K. Argonne National Lab., IL (United States). [1994]. 13p. Sponsored by USDOE, Washington, DC (United States). DOE Contract W-31109-ENG-38. (CONF-9410141–4: Office of Scientific and Technical Information INFOTECH '94, Oak

Ridge, TN (United States), 25-26 Oct 1994). Order Number DE95002981. Source: OSTI; NTIS; GPO Dep.

Current Information Retrieval (IR) technologies allow for efficient access to relevant information, provided that user selected query terms coincide with the specific linguistical choices made by the authors whose works constitute the text-base. Therefore, the challenge is to enhance the limited searching capability of state-of-the-practice IR. This can be done either with augmented clients that overcome current server searching deficiencies, or with added capabilities that can augment searching algorithms on the servers. The technology being investigated is that of deductive databases, with a set of new techniques called cooperative answering. This technology utilizes semantic networks to allow for navigation between possible query search term alternatives. The augmented search terms are passed to an IR engine and the results can be compared. The project utilizes the OSTI Environment, Safety and Health Thesaurus to populate the domain specific semantic network and the text base of ES&H related documents from the Facility Profile Information Management System as the domain specific search space.

9189 (EGG-WTD–11252-Vol.1) **Buried Waste Integrated Demonstration commercialization actions plans. Volume 1.** Kaupanger, R.M. (EG and G Idaho, Inc., Idaho Falls, ID (United States)); Glore, D. EG and G Idaho, Inc., Idaho Falls, ID (United States). Apr 1994. 38p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC07-76ID01570. Order Number DE95002011. Source: OSTI; NTIS; INIS; GPO Dep.

The Buried Waste Integrated Demonstration (BWID) is sponsored by US Department of Energy (DOE) Office of Technology Development. BWID supports the development and demonstration of a suite of technologies that when integrated with commercially available baseline technologies form a comprehensive system for the effective and efficient remediation of buried waste throughout the DOE complex. BWID evaluates, validates, and demonstrates technologies and transfers this information throughout DOE and private industry to support DOE. remediation planning and implementation activities. This report documents commercialization action plans for five technologies with near-term commercialization/implementation potential as well as provides a status of commercial and academic partners for each technology.

9190 (IA–1486, pp. 137) **A computerized data-base system foe personal internal contamination results.** Levinson, S.; German, U.; Laichter, Y.; Naim, E. Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div. Aug 1994. In *Research laboratories annual report 1993.* 206p. Order Number DE95614584. Source: OSTI; NTIS (US Sales Only); INIS.

Short communication. PERSONNEL MONITORING/information systems; DATA BASE MANAGEMENT; INTAKE; NUCLEAR DATA COLLECTIONS; RADIATION DOSES; WHOLE-BODY COUNTING

9191 (KAERI/RR–1178/92) **Development of nuclear theory model for measuring and evaluating basic nuclear data.** Min, Byung Joo (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Kim, Jung Do; Choi, Young Gil. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Dec 1992. 118p. (In Korean). Order Number DE95613312. Source: OSTI; NTIS; INIS.

For the purpose of developing an advanced reactor and nuclear fuel and managing the radwastes, the generation of nuclide and basic nuclear data in the area of energy is required. Since the accuracy of calculation is influenced by these basic elements, a lot of researches for the nuclear data evaluation will be continuously performed. The purposes of this project are: 1st, collection and maintenance of measured data 2nd, establishment of the processing system for collected nuclear data 3rd, introduction and installation of the model calculation code of nuclear data evaluation 4th, production of the evaluated nuclear data by using new measured data and processing system. By accomplishing this project, safety and performance in the design of reactor and shielding components can be improved. Newly developed nuclear data shall be essential for developing the advanced reactor and the fast breeded reactor, while evaluated nuclear data from foreign countries have been used for nuclear data evaluation up to the present. As the result of carrying out this project, KAERI will retain an ability to evaluate nuclear data by his own efforts and this will satisfy the domestic request. Since a lot of qualified manpower are required for nuclear data evaluation, the collaboration with advanced foreign countries shall be accomplished. (Author).

9192 (KAERI/RR–1269/93) **Development of technical information processing systems.** Lee, Ji Ho (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Kim, Tae Whan; Kim, Sun Ja; Kim, Young Min; Choi, Kwang; Oh, Joung Hun; Choung, Hyun Suk; Keum, Jong Yong; Yoo, An Na; Harn, Deuck Haing; Choun, Young Chun. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Dec 1993. 52p. (In Korean). Order Number DE95613311. Source: OSTI; NTIS; INIS.

The major goal of this project is to develop a more efficient information management system by connecting the KAREI serials database which enable the users to access from their own laboratory facilities through KAREI-NET. The importance of this project is to make the serials information of KAERI easily accessible to users as valuable resources for R and D activities. The results of the project are as follows. (1) Development of the serials database and retrieval system enabled us to access to the serials holding information through KAERI-NET. (2) The database construction establishes a foundation for the management of 1,600 serials held in KAERI. (3) The system can be applied not only to KAERI but also to similar medium-level libraries. (Author).

9193 (KAERI/RR–1380/93) **Establishment of nuclear data evaluation system (I).** Chang, Jong Hwa (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Lee, Chang Kun; Kim, Jeong Do; Kim, Young Sik; Kim, Young Jin; Kim, Hyung Guk; Kil, Chung Sup; Kim, Kang Suk. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Aug 1994. 101p. (In Korean). Order Number DE95613313. Source: OSTI; NTIS; INIS.

Nuclear data is fundamental data for development of new type of nuclear, upgrade of nuclear fuel, treatment of radwaste, research on fusion reactor, radioisotope usage, and nuclear medical therapy. Nuclear data is produced with experiments. However rack of experimental data for thousands of nuclides and various reaction types makes it essential to do statistical evaluation and theoretical interpolation. This study is intended to join international cooperation after establishing domestic basis for nuclear data evaluation work. This project is the first year of five year plan to do followings: (1) Establishment of database system to collect experimental data, (2) Setup of computer assistance system for evaluation work, (3) Verification of established system by test evaluation of selected nuclide reaction. The system has a collection of mass data of nuclides, computer codes for test evaluation of total cross section of 0-16 and collection of EXFOR format data for 0-16. This system will be improved continuously on next years. (Author).

9194 (ORNL/CDIAC–69) **Report of the international workshop on quality control of monthly climate data.** Oak Ridge National Lab., TN (United States). [1993]. 27p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC05-84OR21400. (CONF-9310369–Summ.: Report of the international workshop on quality control of monthly climate data, Asheville, NC (United States), 5-6 Oct 1993). Order Number DE95002299. Source: OSTI; NTIS; GPO Dep.

The National Climatic Data Center (NCDC), the US Department of Energy's Carbon Dioxide Information Analysis Center, and the World Meteorological Organization (WMO) cosponsored an international quality control workshop for monthly climate data, October 5–6, 1993, at NCDC. About 40 scientists from around the world participated. The purpose of the meeting was to discuss and compare various quality control methods and to draft recommendations concerning the most successful systems. The near-term goal to improve quality control of CLIMAT messages for the NCDC/WMO publication Monthly Climatic Data for the World was sucessfully met. An electronic bulletin board was established to post errors and corrections. Improved communications among Global Telecommunication System hubs will be implemented. Advanced quality control algorithms were discussed and improvements were suggested. Further data exchanges were arranged.

9195 (SAND–95-0067) **CALSON Process.** Cunningham, L.C. Sandia National Labs., Albuquerque, NM (United States). 23

Jan 1995. 32p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC04-94AL85000. Order Number DE95005911. Source: OSTI; NTIS (US Sales Only); GPO Dep.

The CALSON Process was developed as a result of the Computer-aided Acquistion & Logistic Support Operational Network (CALSON) Project, as an outgrowth of a Process Quality Management and Improvement Team analysis of the production process being used to make nuclear weapon maintenance manuals. Before, the process was entirely a draftingboard operation and very labor and space (storage) intensive; CALSON converted the entire operation to a computer environment, resulting in considerable savings and lessened impact on the environment.

9196 (WHC-SA–1769) **Information systems of the future: Rights and responsibilities.** Preecs, B.L. Westinghouse Hanford Co., Richland, WA (United States). Sep 1993. 9p. Sponsored by USDOE, Washington, DC (United States). DOE Contract AC06-87RL10930. (CONF-9310145–6: INFOTECH '93, Oak Ridge, TN (United States), 20-23 Oct 1993). Order Number DE95005461. Source: OSTI; NTIS; GPO Dep.

A universal information machine is technologically foreseeable, but the rights and responsibilities involved in creating and operating such a system are seldom explored. Government agencies, research laboratories, and other nonprofit organizations will want to use such an information system to conduct research, publish scientific information or explain their work to the public. A truly universal information system would radically alter today's media and information systems. How will public and private uses be balanced?

9904 Law

9197 (IAEA-TECDOC–762, pp. 83-98) **IAEA co-ordinated research programme on operator support systems in nuclear power plants.** Naser, J. (Electric Power Research Inst., Palo Alto, CA (United States)); Kossilov, A. International Atomic Energy Agency, Vienna (Austria). Sep 1994. (CONF-9305401–: Specialists meeting on operator support systems in nuclear power plants, Moscow (Russian Federation), 17-21 May 1993). In *Operator support systems in nuclear power plants. Proceedings of a specialists meeting held in Moscow, Russian Federation, 17-21 May 1993.* 305p. Order Number DE95615882. Source: OSTI; NTIS (US Sales Only); INIS.

Various operator support systems (OSSs) for nuclear power plants are already operational or under development in the Member States. OSSs are based on intelligent data processing and in addition to plant operation, they are becoming more important also for safety. A key feature of OSSs is their availability to structure data to increase its relevance to a given situation. This can improve the user's ability to identify plant function, systems and component state and to identify faults and diagnose them. OSSs can also assist the user to plan and implement corrective actions to improve NPP availability and safety. In September 1991, the IAEA Committee for Contractual Scientific Services approved the Co-ordinated Research Programme (CRP) on "Operator Support Systems in Nuclear Power Plants" in the framework of the Project "Man-Machine Interface Studies". The main objective of the programme is to provide guidance and technology transfer in the development and implementation of OSSs, including the experience with man-machine interface and closely related issues such as control and instrumentation, the use of computers and operator qualification. The paper describes a scientific background of the CRP, working plan and results of the first Co-ordinated Research Meeting, held in Vienna from 13 to 16 October 1992. (author). 3 refs.

9198 (INIS-mf–14446) **Australian Nuclear Science and Technology Organisation strategy review recommendations. Final Report.** Bain International Inc., Sydney, NSW (Australia); Battelle Seattle Research Center, WA (United States); Battelle-Northwest, Richland, WA (United States). Pacific Northwest Lab. 9 Dec 1994. 145p. Order Number DE95616225. Source: OSTI; NTIS (US Sales Only); INIS.

In May 1994 the Australian Nuclear Science and Technology Organization (ANSTO)'s Board initiated a comprehensive five month review which purpose was to develop a mission for ANSTO and thus define its role both domestically and internationally. The review took into account the needs of ANSTO stakeholders, analysed ANSTO capabilities as well as available international opportunities. Outcomes of the review included an assessment of the priorities and needs of stakeholders, an understanding of how these needs can be meet, and the resulting resource implications. ANSTO's major mission objectives, as defined in the consultants's report should be: to support the Government's nuclear policies (this objective is paramount), support industrial competitiveness and innovation through technology transfer, as well as to maintain a high quality nuclear science base and to enable academic institutions and other science organizations to perform research by providing access to unique facilities and expertise. The consultants also made recommendations on appropriate management arrangements for ANSTO, an implementation plan, progress milestones and operational targets. Details of the relevance-excellence analysis, commercial customer analysis and justification for recommended activity action imperatives are presented in the appendices. 48 figs.

9199 (KAERI/RR–1262/93) **Development of training courses in the field of nuclear energy.** Lee, Han Young (Korea Atomic Energy Res. Inst., Taejon (Korea, Republic of)); Soe, In Seok; Lee, Ui Jin; Park, Jae Chang; Kim, Ik Hyeon; Won, Jong Yeol; Nam, Jae Yeol. Korea Cancer Center Hospital, Seoul (Korea, Republic of). Dec 1993. 79p. (In Korean). Order Number DE95613301. Source: OSTI; NTIS; INIS.

The nuclear training center provides various training courses in such areas of nuclear energy as nuclear power technology, radioisotope applications technology, non-destructive technology, nuclear safety, etc. The center also provides in-house staff training courses in project management, computer applications, and other research areas. The objective of the project is to develop new specialized training courses not only nuclear energy areas but also in management, so that localization of nuclear project can be accomplished as early as possible. The scope and contents of the project envision the following aims; 1. to develop specialized nuclear training programs; 2. to develop project management training courses for KAERI staff; 3. to collect and analyze foreign training programs and materials; 4. to develop foreign-assisted training courses; and 5. to develop international training courses for developing country trainese.

Corporate Author Index

This index lists the corporate authors responsible for issuing the documents in this publication which are identified primarily by report number. The corporate names are entered in standardized forms as defined in ETDE/PUB–3 (Rev.1), *International Energy: Research Organizations 1988–1992*. Each entry under a corporate name includes the document title and citation number. Three items of information may appear in parentheses: (1) an abbreviation to identify the document type, such as a report; (2) the country of publication, indicated by International Organization for Standardization (ISO) country code; and (3) the language of the document if non-English (R;CA;In French). Author affiliations are not listed in this index.

A

ABB/Combustion Engineering, Inc., Windsor, CT (United States)
Air toxics evaluation of ABB Combustion Engineering Low-Emission Boiler Systems, 20:7174 (R;US)

ACEC Research and Management Foundation, Washington, DC (United States)
Turning research into results, final report, 20:7961 (R;US)

Acurex Corp., Research Triangle Park, NC (United States)
Emissions reductions in coal-fired home heating stoves through use of briquettes. Quarterly report, April 1, 1994–June 30, 1994, 20:7100 (R;US)

Acurex Environmental Corp., Research Triangle Park, NC (United States)
Emissions reductions in coal-fired home heating stoves through use of briquettes. Quarterly report, July 1, 1994–September 30, 1994, 20:7101 (R;US)

Advisory Committee on Human Radiation Experiments, Washington, DC (United States)
Interim report of the Advisory Committee on human radiation experiments, 20:8606 (R;US)

AEA Decommissioning and Radwaste, Harwell (United Kingdom)
Modelling gas generation in radioactive waste repositories, 20:7288 (R;GB)

Air Products and Chemicals, Inc., Allentown, PA (United States)
Development of novel active transport membrande devices, 20:8139 (R;US)

Air-Conditioning and Refrigeration Technology Inst., Inc., Arlington, VA (United States)
Materials compatibility and lubricants research on CFC-refrigerant substitutes. Quarterly MCLR program technical progress report, 1 July 1994–30 September 1994, 20:8432 (R;US)
Sealed tube comparisons of the compatibility of desiccants with refrigerants and lubricants. Quarterly technical progress report, July 1994–September 1994, 20:7962 (R;US)

Aix-Marseille-1 Univ., 13 - Marseille (France)
Current distributions in superconducting wires subject to a random orientation magnetic field, and corresponding to the Tokamak usual conditions, 20:9033 (R;FR;In French)
Study of the dynamics of the lower hybrid wave during current drive in tokamaks and of the Weyl-Wigner in quantum mechanics, 20:9047 (R;FR;In French)

Akademiet for de Tekniske Videnskaber, Lyngby (Denmark)
Contaminant transport at a waste incinerator residue deposit. 2D hydrogeochemical modelling, 20:8507 (RA;DK)
Diffusion of volatile organic components through concrete floors, 20:8504 (RA;DK;In Danish)
Experimental investigation of the migration of the miscible and immiscible components following a light oil spill, 20:8506 (RA;DK)
New method for cleaning ground water which contains chromate, 20:8502 (RA;DK;In Danish)
Organic micro-pollutions in ground water resources, cleaning and water usage, 20:8501 (RA;DK;In Danish)
Research projects on ground water pollution, 20:8505 (R;DK;In Danish, English)
What is the actual diffusion of pollutants through the earth surface/cellar floor? Can flux-chamber measurements give an answer?, 20:8503 (RA;DK;In Danish)
Winter meeting on ground water pollution, 20:8500 (R;DK;In Danish)

Alabama Univ., University, AL (United States). Dept. of Chemistry
Molecular accessibility in oxidized and dried coals. Quarterly report, 20:7147 (R;US)

Alberta Research Council, Edmonton, AB (Canada)
Advanced direct coal liquefaction concepts. Executive summary, Volume 1, 20:7125 (R;US)
Advanced direct coal liquefaction concepts. Quarterly report, April 1–June 30, 1994, 20:7127 (R;US)
Economic feasibility study: CFR advanced direct coal liquefaction process. Volume 4, 20:7126 (R;US)

Allied-Signal Aerospace Co., Torrance, CA (United States)
Monolithic solid oxide fuel cell technology advancement for coal-based power generation. Final report, September 1989–March 1994, 20:7916 (R;US)

AMAX R and D, Inc., Pittsburgh, PA (United States)
Bench-scale testing of the micronized magnetite process. Quarterly technical progress report No. 1, July–September 1994, 20:7096 (R;US)

American Chemical Society, Washington, DC (United States)
Continuation application, progress report, year IV, June 8, 1993–June 7, 1994, 20:7845 (R;US)

Amir Kabir Technical Univ., Teheran (Iran, Islamic Republic of). Dept. of Physics
Analysis of relativistic free electron wave generator by plasma electrodynamics, 20:9051 (IA;IR;In English, Persian)

Amoco Oil Co., Naperville, IL (United States). Research and Development Dept.
The selective catalytic cracking of Fischer-Tropsch liquids to high value transportation fuels. Quarterly technical progress report No. 5, first quarter fiscal year 1993, October 1, 1992–December 31, 1992, 20:7229 (R;US)
The selective catalytic cracking of Fischer-Tropsch liquids to high value transportation fuels. Quarterly technical status report for first quarter fiscal year, 1994 - report No. 41, October 1, 1993–December 31, 1993, 20:7230 (R;US)

Amoco Production Co., Houston, TX (United States)
West Hackberry Tertiary Project. Quarterly technical progress report, June 3, 1994–September 2, 1994, 20:7218 (R;US)
West Hackberry tertiary project. Quarterly technical progress report, September 3, 1994–December 2, 1994, 20:7219 (R;US)

AN SSSR, Moscow (Russian Federation)
Analysis of the composition of ion-beam irradiated elastomer using the Rutherford back scattering, 20:8166 (IA;RU;In Russian)
Boron-nitrogen interaction in silicon durins a silicon nitrogen structure formation under N^+ ion implantation, 20:9000 (IA;RU;In Russian)
Changes ib structure and properties of amorphous metallic alloys under ion irradiation, 20:8090 (IA;RU;In Russian)
Computerized simulation of rare gas ion implantation in polymer materials, 20:9006 (IA;RU;In Russian)
Crystal defect kritical concentration under crystal-amorphous state transformation of semiconductor materials, 20:8997 (IA;RU;In Russian)
Effect of high energy ions on radiation-induced defects in crystals, 20:8999 (IA;RU;In Russian)
Electric conductivity of ion implanted boron nitride, 20:8124 (IA;RU;In Russian)
Electron induced conductivity in argon ion implanted GaAs, 20:8097 (IA;RU;In Russian)

Energy dependence of radiation yield of resonance nuclear reactions prompted by channeled protons in axial and plane channels of Nb-N_x and Re-C_x systems, 20:8946 (IA;RU;In Russian)
Green profile function technique at the description of ion implantation in the case of axis channeling, 20:9005 (IA;RU;In Russian)
High intensity ion implantation: method of nitride phase formation, 20:8089 (IA;RU;In Russian)
Ion beam modification of hard alloy surfaces, 20:8123 (IA;RU;In Russian)
Ion volumetric rechanneling in heated crystal under implantation, 20:9004 (IA;RU;In Russian)
Layer-by-layer analysis of chemical composition at the interface of Fe-Pd structure irradiated with Xe^+ ions, 20:8093 (IA;RU;In Russian)
Measurement of TiN_x stoichiometry by the method of nuclear proton backscattering, 20:8986 (IA;RU;In Russian)
Mechanical properties of ion-alloyed boron-bearing materials, 20:8095 (IA;RU;In Russian)
Modification of high-chromium die steel by ion alloying, 20:8096 (IA;RU;In Russian)
Modification of properties in proton implanted silicon under heat treatment, 20:8094 (IA;RU;In Russian)
Modification of silicon near surface layer under nitrogen ion implantation, 20:9003 (IA;RU;In Russian)
On the temperature dependence of critical dose of silicon crystal-amorphous state transformation under ion implantation, 20:8998 (IA;RU;In Russian)
Photonuclear transmutation alloying of silicon monocrystals with aluminium, 20:9007 (IA;RU;In Russian)
Structural transformations in SnO_2 films bombarded by Kr^+ ions, 20:9008 (IA;RU;In Russian)
Structure changing and impurity behaviour in silicon under phosphorus 'hot' implantation and annealing, 20:8996 (IA;RU;In Russian)
Study of nitrided titanium, 20:8091 (IA;RU;In Russian)
Study of SiO_2-Si structure implanted by antimony ions, 20:9001 (IA;RU;In Russian)
Study of Ta-Si and CoSi systems implanted by boron and antimony ions, 20:9002 (IA;RU;In Russian)
Temperature dependence of microhardness for aluminium implanted with nickel ions, 20:8098 (IA;RU;In Russian)
The model of radiation-induced crystallization and amorphous layer growth in semiconductors under light ion irradiation, 20:8092 (IA;RU;In Russian)

AN SSSR, Novosibirsk (Russian Federation). Inst. Yadernoj Fiziki
Bernstein-Green-Kruskal wave, 20:9056 (R;RU;In Russian)
Bernstein-Green-Kruskal wave. 2. The interaction with the Langmuir wave. Stochastic phenomena, 20:9057 (R;RU;In Russian)
Calibration of multichannel analyzer of charge-exchange atoms, 20:9060 (R;RU;In Russian)
Conversion of the Bernstein-Green-Kruskal wave on the density perturbation. Part 1, 20:9061 (R;RU;In Russian)
Conversion of the Bernstein-Green-Kruskal wave on the density perturbation. Part 2, 20:9062 (R;RU;In Russian)
Conversion of the Bernstein-Green-Kruskal wave on the density perturbation. Part 3, 20:9063 (R;RU;In Russian)
Conversion of the Bernstein-Green-Kruskal wave on the density perturbation. Part 4, 20:9064 (R;RU;In Russian)
Determination of electric and magnetic fields in open trap plasmas by means of atomic-molecular beam hydrogen isotopes, 20:9059 (R;RU;In Russian)
Energy spectra of charge-exchange atoms from a rotating plasma, 20:9067 (R;RU;In Russian)
HF-stabilization of plasma with sharp boundary, 20:9066 (R;RU;In Russian)
Instability of weakly nonlinear chaotic structures, 20:8687 (R;RU)
Longitudinal losses of charged particles from an open configuration with arbitrary β ratio, 20:9058 (R;RU;In Russian)
Mixing phases of unstable two-level systems, 20:8847 (R;RU)
Nuclear anapole moments in single-particle approximation, 20:8848 (R;RU)
Nuclear magnetic quadrupole moments in single-particle approximation, 20:8849 (R;RU)
Nuclear-spin-dependent parity-nonconserving effects in thallium, lead and bismuth atoms, 20:8953 (R;RU)
On the paraxial equilibrium of the finite β plasma in open magnetic configurations, 20:9041 (R;RU)
Optimization of an expander of a gas-dynamic trap, 20:9065 (R;RU;In Russian)
Radial electric field measurement in a tokamak by the injection of a pulsed neutral beam, 20:9042 (R;RU)
Removal of impurity ions from a magnetic trap with a two-component plasma on their collision with fast component ions, 20:9055 (R;RU;In Russian)
SO(8) colour as possible origin of generations, 20:8713 (R;RU)
Spectroscopic measurements of plasma parameters of planotron and Penning H^- ion source discharges, 20:8685 (R;RU;In Russian)
Statistical properties of chaotic scattering with one open channel, 20:8660 (R;RU)
Vacuum polarization correction to the positronium decay rate, 20:8966 (R;RU)

Anderman/Smith Operating Co., Denver, CO (United States)
Secondary oil recovery from selected Carter sandstone oilfields–Black Warrior Basin, Alabama. Final report, 20:7214 (R;US)

Argonne National Lab., IL (United States)
24-th Order high temperature expansion for the 3-d Ising model, 20:8712 (R;US)
A comparison of noxious facilities' impacts for home owners versus renters, 20:7848 (R;US)
A new target concept for production of slow positrons, 20:8261 (R;US)
A phenomenological model for the effect of nanocrystalline microstructure on irradiation-induced amorphization in U_3Si, 20:8112 (R;US)
A review of high energy polarimetry, with a view toward RHIC, 20:8338 (R;US)
A simple, closed-form expression for the x-ray reflectivity from superlattices with cumulative roughness, 20:8991 (R;US)
A three-bar model for ratcheting of fusion reactor first wall, 20:9094 (R;US)
Advances in research for solid oxide fuel cells, 20:7915 (R;US)
APEX user's guide - (Argonne production, expansion, and exchange model for electrical systems), version 3.0, 20:7904 (R;US)
Atoms as many-body systems, 20:8951 (R;US)
Basic TRUEX process for Rocky Flats Plant, 20:7289 (R;US)
Beryllium in the ITER blanket, 20:9092 (R;US)
Bremsstrahlung scattering calculations for the beam stops and collimators in the APS insertion-device beamlines, 20:8298 (R;US)
Comparison of irradiation behavior of different uranium silicide dispersion fuel element designs, 20:7698 (R;US)
Computational load in model physics of the parallel NCAR community climate model, 20:8430 (R;US)
Contribution of ankyrin-band 3 complexes to the organization and mechanical properties of the membrane skeleton of human erythrocyte, 20:8552 (R;US)
Cooling rate effects on the microstructure, critical current density, and $T_c$transition of one- and two-powder BSCCO-2223 Ag-sheathed tapes, 20:8115 (R;US)
Cryogenic monochromator as a solution to undulator heat loads at third generation synchrotron sources, 20:8309 (R;US)
Decontamination and dismantlement of the Argonne National Laboratory-East Map Tube Facility, 20:7468 (R;US)
Dependence of the Josephson coupling of unconventional superconductors on the properties of the tunneling barrier, 20:9027 (R;US)
Derivation of uranium residual radioactive material guidelines for the 4400 Piehl Road Site, Ottawa Lake, Michigan, 20:7467 (R;US)
Design of a high-temperature superconductor current lead for electric utility SMES, 20:7826 (R;US)
Development of risk-based computer models for deriving criteria on residual radioactivity and recycling, 20:7466 (R;US)
Device-quality tunnel junctions on the high $T_c$superconductor $HgBa_2CuO_{4+\delta}$, 20:8117 (R;US)
Effect of dynamically charged helium on mechanical properties of vanadium-base alloys, 20:9093 (R;US)
Effects of Bi and Bi_2O_3 additions on the microstructure and superconducting properties of powder-in-tube BSCCO (2212) tapes, 20:8113 (R;US)

Electromagnetic production of pions on the nucleon, 20:8778 (R;US)
Epitaxial growth of bcc transition metal films and superlattices onto MgO (111), (011) and (001) substrates, 20:8071 (R;US)
Experimental searches for exotic alpha-cluster configurations, 20:8846 (R;US)
Facility agreements under the chemical weapons convention inspections, 20:8418 (R;US)
Fourth and Fifth Amendment issues raised by Chemical Weapons Convention inspections, 20:8066 (R;US)
Heat-rate improvements obtained by retubing condensers with new, enhanced tube types, 20:7627 (R;US)
Hematopoietic tissue repair under chronic low daily dose irradiation, 20:8607 (R;US)
Insights on radiological risks of US Department of Energy radioactive waste management alternatives in the Environmental Management Programmatic Environmental Impact Statement, 20:7465 (R;US)
Legal aspects of national implementation of the Chemical Weapons Convention, 20:8067 (R;US)
Lithiated oxides for lithium-ion batteries, 20:7828 (R;US)
Long-baseline neutrino oscillation experiments, 20:8823 (R;US)
Microstructure and composition of a SNS Josephson junction using $CaRuO_3$ as the metallic barrier, 20:9026 (R;US)
Modeling of tritium recovery from lithium ceramics, 20:8212 (R;US)
Nanostructured materials, 20:8972 (R;US)
Negative binomial fits to multiplicity distributions from central collisions of ^{16}O + Cu at 14.6A GeV/c and intermittency, 20:8880 (R;US)
New results in nucleon-nucleon scattering at intermediate energies, 20:8777 (R;US)
NMR study of nanophase Al/Al-oxide powder and consolidated composites, 20:8136 (R;US)
Optimization of beryllium for fusion blanket applications, 20:9091 (R;US)
Overview of selected molecular biological databases, 20:8553 (R;US)
Oxygen stoichiometry and its influence on superconductivity in $Bi_2Sr_2CaCu_2O_{8+x}$, 20:8114 (R;US)
Phonon-induced anomalous specific heat of a model nanocrystal by computer simulation, 20:8971 (R;US)
Pipeline corridors through wetlands - impact on plant communities: Mill Creek Tributary Crossing, Jefferson County, New York, 1991 survey. Topical report, June 1991–April 1993, 20:7252 (R;US)
Pipeline corridors through wetlands – Impacts on plant communities: Little Timber Creek Crossing, Gloucester County, New Jersey. Topical report, August 1991–January 1993, 20:7253 (R;US)
Pipeline corridors through wetlands – Impacts on plant communities: Norris Brook Crossing Peabody, Massachusetts, 20:7254 (R;US)
Postirradiation examination of a low enriched U_3Si_2-Al fuel element manufactured and irradiated at Batan, Indonesia, 20:7762 (R;US)
Practical superconductor development for electrical power applications, annual report for FY 1994, 20:8268 (R;US)
Process to remove rare earth from IFR electrolyte, 20:7278 (PA;US)
Processing of single- and multi-domain $YBa_2Cu_3O_x$ bulk materials for levitation applications by $Nd_{1+x}Ba_{2-x}Cu_3O_y$ seeding, 20:8118 (R;US)
Progress in tritium retention and release modeling for ceramic breeders, 20:7675 (R;US)
Proton-proton interactions using the RHIC polarized collider, 20:8776 (R;US)
Pulse radiolysis of alkanes: A time-resolved electron paramagnetic resonance study, 20:8197 (R;US)
Radioactivity computation of steady-state and pulsed fusion reactors operation, 20:9095 (R;US)
Radium in humans: A review of U.S. studies, 20:8608 (R;US)
Raising the IQ in full-text searching via intelligent querying, 20:9188 (R;US)
Relative performance properties of the ORNL Advanced Neutron Source Reactor with reduced enrichment fuels, 20:7763 (R;US)
Rocking response of tanks containing two liquids, 20:8223 (R;US)
Scalable, extensible, and portable numerical libraries, 20:9153 (R;US)
Scale-invariant Lipatov kernels from t-channel unitarity, 20:8709 (R;US)
Shakedown analysis of fusion reactor first wall, 20:9096 (R;US)
Sloshing response of nonuniform density liquid in a laterally excited tank, 20:8224 (R;US)
Some thoughts of future experiments with the new generation of storage rings, 20:8965 (R;US)
Squeezing out all the performance: Using Ingres for a C^3I reporting system, 20:8417 (R;US)
Status of the solid breeder materials database, 20:7674 (R;US)
Structural alloy with a protective coating containing silicon or silicon-oxide, 20:8104 (PA;US)
Support girder design for the atlas hadron calorimeter, 20:8341 (R;US)
Swelling and structure of vanadium-base alloys irradiated in the dynamic helium charging experiment, 20:8070 (R;US)
The interactions of high-energy, highly charged Xe ions with buckyballs, 20:8958 (R;US)
The off-shell axial anomaly via the $\gamma^*\pi^0 \rightarrow \gamma$ transition, 20:8826 (R;US)
The STAR EM calorimeter design and small prototype test results, 20:8339 (R;US)
Thermal effects on the STAR electromagnetic calorimeter, 20:8340 (R;US)
Time-resolved EPR studies of the H atom: A stable heavy isotope of muonium, 20:8196 (R;US)
Transition metal oxides for rocking-chair cells, 20:7829 (R;US)
Transportation technology transitions and macroeconomic growth – Contemporary evidence, 20:8010 (R;US)
Twenty five years of clusters – from Bochum to Strasbourg, 20:8845 (R;US)
U.S. technical report for the ITER blanket/shield: A. blanket: Topical report, July 1990–November 1990, 20:9104 (R;US)
Ultrafast, high precision gated integrator, 20:8269 (R;US)
Uranium-contaminated soils: Ultramicrotomy and electron beam analysis, 20:7441 (R;US)
Use of labeled primers for differential display, 20:8572 (R;US)
Users guide for the ANL IBM SP1, 20:9154 (R;US)
Validation of the WIMSD4M cross-section generation code with benchmark results, 20:7761 (R;US)
Validation of tritium transport models for Li_2O, 20:9090 (R;US)
X-ray photoelectron spectroscopy analysis of cleaning procedures for synchrotron radiation beamline materials at the Advanced Photon Source, 20:8332 (R;US)
Zone refining of sintered, microwave-derived YBCO superconductors, 20:8116 (R;US)

Argonne National Lab., IL (United States). Center for Transportation Research
Methods of valuing air pollution and estimated monetary values of air pollutants in various U.S. regions, 20:7849 (R;US)

Arizona State Univ., Tempe, AZ (United States). Dept. of Chemistry and Biochemistry
Generation, detection and characterization of gas-phase transition metal aggregates and compounds. Final technical report, September 15, 1991–July 14, 1994, 20:8181 (R;US)

Arkansas Univ., Little Rock, AR (United States)
Electrostatic beneficiation of coal. Quarterly technical progress report, July 1, 1994–September 30, 1994, 20:7099 (R;US)

Association Euratom-CEA, Centre d'Etudes de Cadarache, 13 - Saint-Paul-lez-Durance (France). Dept. de Recherches sur la Fusion Controlee
Current distributions in superconducting wires subject to a random orientation magnetic field, and corresponding to the Tokamak usual conditions, 20:9033 (R;FR;In French)
Study and realization of a power circuit of a superconducting dipole generator of a magnetic field, 20:9097 (R;FR;In French)
Study of the dynamics of the lower hybrid wave during current drive in tokamaks and of the Weyl-Wigner in quantum mechanics, 20:9047 (R;FR;In French)

Association Euratom-Kernforschungszentrum Karlsruhe GmbH (KFK) (Germany)
Fusion energy and intense neutron sources in China, 20:9118 (IA;DE)
Fusion Programme Evaluation Board, 20:9111 (IA;DE)
Material development for fusion reactors, 20:9114 (IA;DE)

Materials development for DEMO and commercial fusion reactors, 20:9112 (IA;DE)
Mirror based fusion neutron sources for fusion material testing, 20:9121 (IA;DE)
Mirror beam plasma neutron source, 20:9120 (IA;DE)
Mirror type plasma neutron source, 20:9119 (IA;DE)
New fusion research and development stage with an experimental reactor, 20:9113 (IA;DE)
Plan of new stage fusion R and D in Japan, 20:9109 (IA;DE)
Proceedings of the IEA-workshop on intense neutron sources. IEA-implementing agreement for a programme of research and development on fusion materials. Working group task - annex II, 20:7524 (I;DE)
Proposal of an intense 14 MeV neutron source based on μCF, 20:7529 (IA;DE)
Some information and remarks concerning plans to build a European spallation source for neutron scattering application, 20:7530 (IA;DE)
Summary of ESNIT, 20:7525 (IA;DE)
Summary of IEA neutron source working group activities, 20:7531 (IA;DE)
Target design analysis for an intense T-H_2O neutron source, 20:7528 (IA;DE)
The high intensity D-Li source, 20:7526 (IA;DE)
The intense T-H_2O neutron source, 20:7527 (IA;DE)
The possibilities for a staged approach in the development of intense neutron sources, 20:7532 (IA;DE)
The role of intense neutron sources and other irradiation facilities in materials development, 20:9115 (IA;DE)
The role of intense neutron sources and other irradiation facilities in materials development for fusion, 20:9117 (IA;DE)
The role of neutron irradiation facilities, 20:9116 (IA;DE)
U.S. strategy for the development of fusion reactors, 20:9110 (IA;DE)

Atlantic Council of the United States, Washington, DC (United States)
US–Japan energy policy consultations, 20:7888 (R;US)

Atomic Energy Establishment, Cairo (Egypt)
Environmental monitoring at Inshas area, 20:8454 (IA;EG)
Transport of radionuclides in fresh water stream, 20:8539 (IA;EG)

Atomic Energy of Canada Ltd., Chalk River, ON (Canada)
Soil treatment to remove uranium and related mixed radioactive heavy metal contaminants. Seventh quarterly technical progress report, July 1, 1994–September 30, 1994, 20:8470 (R;US)

Atomic Energy Organization of Iran, Teheran (Iran, Islamic Republic of)
Characterization of superconducting thin films by rutherford backscattering analysis, 20:8985 (IA;IR;In English, Persian)
Modulation transfer function measurement for the film-converter imaging technique in neutron radiography, 20:8945 (IA;IR;In English, Persian)

Atomic Energy Organization of Iran, Teheran (Iran, Islamic Republic of). Nuclear Research Centre
Physics and archaeology an application of nuclear analytical technique, 20:8164 (IA;IR;In English, Persian)

Auburn Univ., AL (United States). Dept. of Chemical Engineering
Configurational diffusion of asphaltenes in fresh and aged catalyst extrudates. Quarterly progress report, 20 June 1994–20 September 1994, 20:7133 (R;US)
Low severity coal liquefaction promoted by cyclic olefins. Quarterly report, July–September, 1994, 20:7131 (R;US)
The role of the resid solvent in coprocessing with finely divided catalysts. Quarterly report, July–September, 1994, 20:7129 (R;US)

B

Bain International Inc., Sydney, NSW (Australia)
Australian Nuclear Science and Technology Organisation strategy review recommendations. Final Report, 20:9198 (I;AU)

Battelle Seattle Research Center, WA (United States)
Australian Nuclear Science and Technology Organisation strategy review recommendations. Final Report, 20:9198 (I;AU)

Battelle-Northwest, Richland, WA (United States). Pacific Northwest Lab.
Australian Nuclear Science and Technology Organisation strategy review recommendations. Final Report, 20:9198 (I;AU)

Bayernwerk AG, Muenchen (Germany)
Bayernwerk AG und -Konzern. Report on the 72nd business year from October 1, 1991 to September 30, 1992, 20:7910 (I;DE;In German)

BDM Oklahoma, Inc., Bartlesville, OK (United States)
Field application of in situ combustion – past performance/future application: Proceedings, 20:7227 (R;US)

Bechtel Corp., San Francisco, CA (United States)
Refining and end use of coal liquids. Quarterly report, April–June 1994, 20:7123 (R;US)

Bechtel Environmental, Inc., Oak Ridge, TN (United States)
Selection of liquid-level monitoring method for the Oak Ridge National Laboratory inactive liquid low-level waste tanks, remedial investigation/feasibility study, 20:7333 (R;US)

Bechtel Hanford, Inc., Richland, WA (United States)
Environmental Restoration Program technology baseline plan, 20:7472 (R;US)

Bechtel Savannah River, Inc., Aiken, SC (United States)
Cadmium Control and Safety Rod Disposal at the Savannah River Site, 20:7426 (R;US)

Bethlehem Steel Corp., PA (United States)
Blast furnace granular coal injection project. Annual report, January–December 1993, 20:7169 (R;US)

Birch og Krogboe A/S, Virum (Denmark)
Energy saving consultancy and training in Latvia. Final report for phases C1, D and E1 with an update for phases A and B, 20:7889 (R;DK)

Birmingham Univ. (United Kingdom)
Characterization of superconducting thin films by rutherford backscattering analysis, 20:8985 (IA;IR;In English, Persian)

Boeing Computer Services Co., Richland, WA (United States)
Workflow automation architecture standard, 20:9151 (R;US)

Brigham and Women's Hospital, Boston, MA (United States)
Report on the Second International Workshop on Human Chromosome 9, 20:8573 (R;US)

Brigham Young Univ., Provo, UT (United States)
Investigation of mineral transformations and ash deposition during staged combustion. Quarterly technical progress report, July 1–September 30, 1994, 20:7178 (R;US)
Particulate behavior in a controlled-profile pulverized coal-fired reactor: A study of coupled turbulent particle dispersion and thermal radiation transport. Quarterly technical progress report, June 15–September 14, 1994, 20:7173 (R;US)

Brookhaven National Lab., Upton, NY (United States)
A high-energy high-luminosity $\mu^+ - \mu^-$ collider, 20:8284 (R;US)
A study of the electrochemical behavior in tungsten and caustic solutions and platinum/iridium in chloride solutions, informal report, 20:8072 (R;US)
A summary of the report on prospects for pyrolysis technologies in managing municipal, industrial, and Department of Energy cleanup wastes, 20:8041 (R;US)
ALARA notes, Number 8, 20:7291 (R;US)
Baryon spectroscopy and the omega minus, 20:8824 (R;US)
Can we estimate bacterial growth rates from ribosomal RNA content?, 20:8595 (R;US)
Canadian R&D on oil-fired combustion systems, 20:7950 (RA;US)
Catalase as an indicator of microbial contamination in fuel oil, 20:7954 (RA;US)
Chiral symmetry on the lattice, 20:8710 (R;US)
Concepts and techniques: Active electronics and computers in safety-critical accelerator operation, 20:8282 (R;US)
Crystalline beams: Theory, experiments, and proposals, 20:8300 (R;US)
Design study for advanced flame quality indicator, 20:7956 (RA;US)
Development of oil heat chimney venting tables, 20:7958 (RA;US)
Dynamic modeling and response of rigid embedded cylinders, 20:8225 (R;US)
Experimental evaluation of mercury release from molten lead, 20:8638 (R;US)

FT-IR microscopical analysis with synchrotron radiation: The microscope optics and system performance, 20:8981 (R;US)
Laboratory Directed Research and Development Program: Annual report to the Department of Energy, 20:9127 (R;US)
Lasers for RF guns: Proceedings, 20:8310 (R;US)
Material unaccounted for at the Southwest Experimental Fast Oxide Reactor: The SEFOR MUF, 20:7764 (R;US)
Measurement of thermal regain in duct systems located in partially conditioned buffer spaces. Informal report, 20:7959 (R;US)
Microphysical and compositional influences on shortwave radiative forcing of climate by sulfate aerosols, 20:8431 (R;US)
Negative binomial fits to multiplicity distributions from central collisions of ^{16}O + Cu at 14.6A GeV/c and intermittency, 20:8880 (R;US)
Nitrogen oxides (NO_x) and oil burners, 20:7951 (RA;US)
NSLS control system upgrade, 20:8311 (R;US)
Oil heat technology - efficiency training manual, 20:7948 (RA;US)
Operation of a small-gap undulator on the NSLS X-ray Ring, 20:8312 (R;US)
Organizational factors and nuclear power plant safety, 20:7780 (R;US)
Part I - Oil heat technology research and development. Part II - NAECA 2002, what, when, and who?, 20:7947 (RA;US)
Photon stimulated desorption (PSD) measurements of extruded copper and of welded copper beam chambers for the PEP II asymmetric B-factory, 20:8333 (R;US)
Possible use of the AGS linac for proton therapy, 20:8283 (R;US)
Premium performance heating oil, 20:7955 (RA;US)
Probing anomalous gauge boson couplings at LEP, 20:8753 (R;US)
Program of technical assistance to the organization for the prohibition of chemical weapons, informal report, 20:8419 (R;US)
Proposal for using optical transition radiation for electron beam alignment and emittance measurement for the free emittance measurement for the free electron laser experiments at ATF, 20:8299 (R;US)
Prospects for pyrolysis technologies in managing municipal, industrial, and DOE cleanup wastes, 20:7542 (R;US)
Residential fuel quality study (Part II), 20:7953 (RA;US)
Results of the validation of the oil heat vent analysis program (OHVAP), 20:7957 (RA;US)
Search for strangelets and other rare objects in Au + Pt collisions at the AGS using a fixed-angle focusing spectrometer, 20:8879 (R;US)
Seismic analysis of the Par Pond Dam: Study of slope failure and liquefaction. Technical evaluation report, 20:8646 (R;US)
Subsurface barrier verification technologies, informal report, 20:7290 (R;US)
Tau physics 1994: A theoretical perspective, 20:8825 (R;US)
The development of a positron ionization gauge, 20:8415 (R;US)
The fan atomized burner - status and application testing, 20:7952 (RA;US)
The photosynthetic acclimation of Lolium perenne growing in a free-air CO_2 enrichment (FACE) system, 20:8585 (R;US)
The real structure of columnar pinning centers in heavy-ion-irradiated cuprate superconductors, 20:8119 (R;US)
Understanding earthquake design criteria used in Japan, 20:7781 (R;US)
Update on B_K with Wilson fermions, 20:8711 (R;US)
Update on the build with oil program and the oilheat manufacturers association, 20:7949 (RA;US)
XAS studies of Ni(I), Ni(II), and Ni(III) complexes, 20:8179 (R;US)

Brooklyn Coll., NY (United States). Dept. of Chemistry
Risk contribution from low power, shutdown, and other operational modes beyond full power, 20:7650 (R;US)

Brown Univ., Providence, RI (United States). Div. of Engineering
A new model of coal-water interaction and relevance for dewatering. Final report, 20:7087 (R;US)
Macromolecular structure analysis and effective liquefaction pretreatment. Quarterly technical progress report, 1 January 1991–31 March 1991, 20:7115 (R;US)
Macromolecular structure analysis and effective liquefaction pretreatment. Quarterly technical progress report, 1 April 1991–30 June 1991, 20:7116 (R;US)
Macromolecular structure analysis and effective liquefaction pretreatment. Quarterly technical progress report, 1 July 1991–30 September 1991, 20:7117 (R;US)
Macromolecular structure analysis and effective liquefaction pretreatment. Annual technical report, [October 1991–December 1991], 20:7118 (R;US)
Macromolecular structure analysis and effective liquefaction pretreatment. Quarterly technical progress report, 1 January 1992–31 March 1992, 20:7119 (R;US)
Macromolecular structure analysis and effective liquefaction pretreatment. Quarterly technical progress report, 1 April 1992–30 June 1992, 20:7120 (R;US)
Macromolecular structure analysis and effective liquefaction pretreatment. Quarterly technical progress report, 1 July 1992–30 September 1992, 20:7121 (R;US)
Macromolecular structure analysis and effective liquefaction pretreatment. Eighth quarterly technical progress report, [October–December 1992], 20:7122 (R;US)

Bundesforschungsanstalt fuer Landwirtschaft, Braunschweig (Germany)
Bundesforschungsanstalt fuer Landwirtschaft Braunschweig-Voelkenrode (FAL). Annual report 1992, 20:7537 (I;DE;In German)

Bundesgesundheitsamt, Berlin (Germany). Inst. fuer Sozialmedizin und Epidemiologie
Gas chromatographic analysis of volatile hydrocarbons to detect irradiated chicken, pork and beef - an intercomparison study. A report in English and German, 20:8600 (R;DE;In English, German)
Thermoluminescence analysis to detect irradiated spices, herbs and spice-and-herb mixtures - an intercomparison study. A report in English and German, 20:8601 (R;DE;In English, German)

Bundesvereinigung der Firmen im Gas- und Wasserfach e.V. (FIGAWA), Koeln (Germany)
FIGAWA. Annual report 1991, 20:7901 (I;DE;In German)

Bureau of Indian Affairs, Washington, DC (United States)
Blue Creek Winter Range: Wildlife Mitigation Project. Final environmental assessment, 20:7579 (R;US)

Burton Technologies, Inc., Raleigh, NC (United States)
Wear resistant composite structure of vitreous carbon containing convoluted fibers, 20:8137 (R;US)

C

California State Air Resources Board, Sacramento, CA (United States)
Toxic volatile organic compounds in environmental tobacco smoke: Emission factors for modeling exposures of California populations, 20:8461 (R;US)

California Univ., Berkeley, CA (United States)
Controls over nutrient flow through plants and microbes in Arctic tundra. Final technical report, 20:8586 (R;US)
Further studies of the effects of oxidation on the surface properties of coal and coal pyrite, 20:7144 (R;US)

California Univ., Berkeley, CA (United States). Dept. of Materials Science and Mineral Engineering
Predicting the transport properties of sedimentary rocks from microgeometry, 20:8647 (R;US)

California Univ., Los Angeles, CA (United States)
Evidence for modified transport due to sheared E x B flows in high-temperature plasmas, 20:9049 (R;US)

California Univ., Los Angeles, CA (United States). Dept. of Physics
Evidence for modified transport due to sheared E x B flows in high-temperature plasmas, 20:9049 (R;US)
Recent progress in one-loop multi-parton calculations, 20:8769 (R;US)

California Univ., Riverside, CA (United States)
Negative binomial fits to multiplicity distributions from central collisions of ^{16}O + Cu at 14.6A GeV/c and intermittency, 20:8880 (R;US)

Canadian Energy Development, Inc., Edmonton, AB (Canada)
Advanced direct coal liquefaction concepts. Executive summary, Volume 1, 20:7125 (R;US)

Advanced direct coal liquefaction concepts. Quarterly report, April 1–June 30, 1994, 20:7127 (R;US)
Economic feasibility study: CFR advanced direct coal liquefaction process. Volume 4, 20:7126 (R;US)

Carl Bro A/S, Glostrup (Denmark)
Rehabilitation of two gas pipes crossing the river Nemunas in Kaunas, Lithuania. Final report, 20:7255 (R;DK)

Carl Bro Gruppen, Glostrup (Denmark)
Rehabilitation of two gas pipes crossing the river Nemunas in Kaunas, Lithuania. Final report, 20:7255 (R;DK)

Case Western Reserve Univ., Cleveland, OH (United States)
Ionization in liquids [annual] progress report, 1993–1994, 20:8200 (R;US)
Ionization in liquids. Progress report, November 1, 1990–October 31, 1993, 20:8199 (R;US)
[Ionization in liquids: Request for 1992–1993 funding and 1991–1992 progress report], 20:8198 (R;US)

CEA Centre d'Etudes de Cadarache, 13 - Saint-Paul-lez-Durance (France). Dept. d'Etudes des Reacteurs
Application of active neutronic interrogation method to the line analysis in reprocessing plant, 20:7264 (R;FR;In French)

CEA Centre d'Etudes de Fontenay-aux-Roses, 92 (France)
Interactive three dimensional simulation for generation of synthetical returns in remote handling assisted by computer, 20:8228 (R;FR;In French)

CEA Centre d'Etudes de Grenoble, 38 (France). Dept. de Thermohydraulique et de Physique
Finite elements volumes methods: applications to the Navier-Stokes equations and convergence results, 20:8251 (R;FR;In French)

CEA Centre d'Etudes de Saclay, 91 - Gif-sur-Yvette (France). Dept. de Technologie des Materiaux
Ordered compounds under irradiation: dynamical equilibrium phase diagrams and microstructural evolutions, 20:8074 (R;FR;In French)
Study of point defects and matter transport in cubic face centered concentrated alloys, 20:8073 (R;FR;In French)

CEA Centre d'Etudes de Valduc, 21 - Is-sur-Tille (France)
Reliability studies by fast electronic simulation. Realization of an apparatus of configuration made by computer in function of the model to study, 20:7707 (R;FR;In French)

Centro de Investigaciones Energeticas, Medioambientales y Tecnologicas (CIEMAT), Madrid (Spain)
Mobile units to hydro geochemistry characterization, 20:8474 (R;ES;In Spanish)
Study of isotopic desequilibrium of natural radioactive series in granitic environment: Pluton of El Berrocal (Toledo), 20:8475 (R;ES;In Spanish)

CH2M Hill Southeast, Inc., Oak Ridge, TN (United States)
Selection of liquid-level monitoring method for the Oak Ridge National Laboratory inactive liquid low-level waste tanks, remedial investigation/feasibility study, 20:7333 (R;US)

Chicago Univ., IL (United States). Dept. of Chemistry
Molecular catalytic coal liquid conversion. Quarterly progress report, 20:7130 (R;US)

China Nuclear Information Centre, Beijing, BJ (China)
A new set of average level spacings for s-wave resonance, 20:8852 (RA;CN)
A theoretical calculation of n-T scattering cross sections, 20:8899 (RA;CN)
Calculation of thermal neutron scattering law for anisotropic microcrystals, 20:8944 (RA;CN)
CFUP1- a program for calculating neutron or charged particle induced reactions on fissile nuclei in energy range up to 35 MeV, 20:9156 (RA;CN)
CMUP2- a program for calculating neutron or charged particle induced reactions in energy range up to 50 MeV, 20:9155 (RA;CN)
Communication of nuclear data progress: No.6 Supplement (1992), 20:8881 (R;CN)
Communication of nuclear data progress: No.9 (1993), 20:8897 (R;CN)
Computer program library at CNDC, 20:9157 (RA;CN)
Covariance data evaluation for experimental data, 20:9158 (RA;CN)
Determination of micro-amount carbon in sodium metal by vacuum distillation-gas chromatography, 20:8152 (R;CN;In Chinese)
Diffusion process of nuclear fission, 20:8900 (RA;CN)
Evaluated neutron data file for indium, 20:8889 (RA;CN)
Evaluation of hafnium neutron cross sections, 20:8890 (RA;CN)
Evaluation of neutron nuclear data of sodium, 20:8883 (RA;CN)
Evaluation of neutron nuclear data of natural calcium for CENDL-2, 20:8885 (RA;CN)
Evaluation of neutron nuclear data of ^{239}Pu for CENDL-2, 20:8891 (RA;CN)
Evaluation of neutron nuclear data for ^{240}Pu, 20:8892 (RA;CN)
Evaluation of neutron nuclear data for ^{241}Am, 20:8893 (RA;CN)
Evaluation of neutron nuclear data for ^{249}Bk, 20:8894 (RA;CN)
Evaluation of neutron nuclear data for ^{249}Cf, 20:8895 (RA;CN)
Evaluation of neutron nuclear data for ^{7}Li, 20:8903 (RA;CN)
Nuclear data sheets update for A = 61, 20:8851 (RA;CN)
Optical model parameters and fast neutron small angles scattering cross sections, 20:8898 (RA;CN)
Pathology study of radiation injury in the rat testes, 20:8610 (R;CN;In Chinese)
Post accident core damage assessment methodology and code, 20:7651 (R;CN;In Chinese)
Progress on Chinese evaluated nuclear parameter library (CENPL) (II), 20:8843 (RA;CN)
Progress on frequently useful nuclear decay data library, 20:8868 (RA;CN)
Progress on nuclear structure and decay data evaluation for A-chain in China, 20:8850 (RA;CN)
Progress on the evaluation of charged particle nuclear reaction data in Sichuan University, 20:8905 (RA;CN)
Review and evaluation of fission barrier properties research, 20:8901 (RA;CN)
Revision on recommended data of ^{238}U for CENDL-2, 20:8904 (RA;CN)
Several examples of least squares combination for derived data, 20:9159 (RA;CN)
Study of impurity concentrations by VUV spectroscopy on HL-1, 20:9043 (R;CN)
Study on LOMI decontamination technology, 20:8609 (R;CN;In Chinese)
Study on the extraction of Am^{3+} and rare earth elements with β-oxime extractant (7804) (I), 20:8153 (R;CN;In Chinese)
Study on the large position sensitive detector, 20:8343 (R;CN;In Chinese)
Study on treatment of wastewater containing plutonium in CIAE (China Institute of Atomic Energy), 20:7292 (R;CN;In Chinese)
Syntheses of nucleic acid and protein in somatic embryos of Fritillaria ussuriensis maxim in different development stages, 20:8596 (R;CN)
Techniques used for charged particle nuclear data evaluation at CNDC, 20:8902 (RA;CN)
The calibration facilities of gamma-ray spectrometer oil logging system, 20:8342 (R;CN;In Chinese)
The effects of H^+ implants on $YBa_2Cu_3O_7$ superconducting materials, 20:9028 (R;CN;In Chinese)
The establishment of EXFOR nuclear data based system and experimental neutron data library, 20:8873 (RA;CN)
The evaluation of ^{31}P complete data for CENDL-2, 20:8884 (RA;CN)
The evaluation of cobalt data for 10^{-5} eV to 20 MeV neutrons, 20:8887 (RA;CN)
The evaluation of Mn data for 10^{-5} eV to 20 MeV neutrons, 20:8886 (RA;CN)
The evaluation of natural cadmium neutron data, 20:8888 (RA;CN)
The evaluation of oxygen complete neutron data for CENDL-2, 20:8882 (RA;CN)
The forbidden angular region of secondary particle emission in the laboratory system, 20:8872 (RA;CN)
The summary for recommended data of natural Zn, ^{232}Th and ^{235}U for CENDL-2, 20:8896 (RA;CN)
Theoretical progress at CNDC theory group, 20:8871 (RA;CN)

Chinese Nuclear Data Center, Beijing, BJ (China)
A new set of average level spacings for s-wave resonance, 20:8852 (RA;CN)

A theoretical calculation of n-T scattering cross sections, 20:8899 (RA;CN)
Calculation of thermal neutron scattering law for anisotropic microcrystals, 20:8944 (RA;CN)
CFUP1- a program for calculating neutron or charged particle induced reactions on fissile nuclei in energy range up to 35 MeV, 20:9156 (RA;CN)
CMUP2- a program for calculating neutron or charged particle induced reactions in energy range up to 50 MeV, 20:9155 (RA;CN)
Communication of nuclear data progress: No.6 Supplement (1992), 20:8881 (R;CN)
Communication of nuclear data progress: No.9 (1993), 20:8897 (R;CN)
Computer program library at CNDC, 20:9157 (RA;CN)
Covariance data evaluation for experimental data, 20:9158 (RA;CN)
Diffusion process of nuclear fission, 20:8900 (RA;CN)
Evaluated neutron data file for indium, 20:8889 (RA;CN)
Evaluation of hafnium neutron cross sections, 20:8890 (RA;CN)
Evaluation of neutron nuclear data of sodium, 20:8883 (RA;CN)
Evaluation of neutron nuclear data of natural calcium for CENDL-2, 20:8885 (RA;CN)
Evaluation of neutron nuclear data of ^{239}Pu for CENDL-2, 20:8891 (RA;CN)
Evaluation of neutron nuclear data for ^{240}Pu, 20:8892 (RA;CN)
Evaluation of neutron nuclear data for ^{241}Am, 20:8893 (RA;CN)
Evaluation of neutron nuclear data for ^{249}Bk, 20:8894 (RA;CN)
Evaluation of neutron nuclear data for ^{249}Cf, 20:8895 (RA;CN)
Evaluation of neutron nuclear data for ^{7}Li, 20:8903 (RA;CN)
Nuclear data sheets update for A = 61, 20:8851 (RA;CN)
Optical model parameters and fast neutron small angles scattering cross sections, 20:8898 (RA;CN)
Progress on Chinese evaluated nuclear parameter library (CENPL) (II), 20:8843 (RA;CN)
Progress on frequently useful nuclear decay data library, 20:8868 (RA;CN)
Progress on nuclear structure and decay data evaluation for A-chain in China, 20:8850 (RA;CN)
Progress on the evaluation of charged particle nuclear reaction data in Sichuan University, 20:8905 (RA;CN)
Review and evaluation of fission barrier properties research, 20:8901 (RA;CN)
Revision on recommended data of ^{238}U for CENDL-2, 20:8904 (RA;CN)
Several examples of least squares combination for derived data, 20:9159 (RA;CN)
Techniques used for charged particle nuclear data evaluation at CNDC, 20:8902 (RA;CN)
The establishment of EXFOR nuclear data based system and experimental neutron data library, 20:8873 (RA;CN)
The evaluation of ^{31}P complete data for CENDL-2, 20:8884 (RA;CN)
The evaluation of cobalt data for 10^{-5} eV to 20 MeV neutrons, 20:8887 (RA;CN)
The evaluation of Mn data for 10^{-5} eV to 20 MeV neutrons, 20:8886 (RA;CN)
The evaluation of natural cadmium neutron data, 20:8888 (RA;CN)
The evaluation of oxygen complete neutron data for CENDL-2, 20:8882 (RA;CN)
The forbidden angular region of secondary particle emission in the laboratory system, 20:8872 (RA;CN)
The summary for recommended data of natural Zn, ^{232}Th and ^{235}U for CENDL-2, 20:8896 (RA;CN)
Theoretical progress at CNDC theory group, 20:8871 (RA;CN)

City of Hope Beckman Research Inst., Duarte, CA (United States)
Improvement and automation of ligation-mediated genomic sequencing. Final report, 20:8581 (R;US)

Clark Atlanta Univ., GA (United States). Dept. of Engineering
Study of the effects of ambient conditions upon the performance of fan powered, infrared, natural gas burners. Quarterly technical progress report, September 1–September 30, 1994, 20:7257 (R;US)

Colorado School of Mines, Golden, CO (United States)
Interdisciplinary study of reservoir compartments. Quarterly technical progress report, July 1, 1994–September 30, 1994, 20:7212 (R;US)

Colorado State Univ., Fort Collins, CO (United States). Dept. of Physics
Measurement of the magnetically-induced QED birefringence of the vacuum and an improved search for laboratory axions: Technical report. Project definition study of the use of assets and facilities of the Superconducting Super Collider Laboratory, 20:8754 (R;US)

Columbia Univ., New York, NY (United States)
Surfactant loss control in chemical flooding: Spectroscopic and calorimetric study of adsorption and precipitation on reservoir minerals. Quarterly technical progress report, July 1, 1994–October 31, 1994, 20:7211 (R;US)
Surfactant loss control in chemical flooding: Spectroscopic and calorimetric study of adsorption and precipitation on reservoir minerals. Quarterly technical progress report, April 1, 1994–June 30, 1994, 20:7210 (R;US)

Columbia Univ., New York, NY (United States). Dept. of Physics
Negative binomial fits to multiplicity distributions from central collisions of ^{16}O + Cu at 14.6A GeV/c and intermittency, 20:8880 (R;US)

Combustion Engineering, Inc., Windsor, CT (United States)
Advanced light water reactor plants system 80+™ design certification program. Annual progress report, October 1, 1993–September 30, 1994, 20:7652 (R;US)

Conservatoire National des Arts et Metiers (CNAM), 75 - Paris (France)
Study and realization of a power circuit of a superconducting dipole generator of a magnetic field, 20:9097 (R;FR;In French)

CONSOL, Inc., Library, PA (United States)
A characterization and evaluation of coal liquefaction process streams. Quarterly technical progress report, June 29–September 30, 1994, 20:7138 (R;US)

Cornell Univ., Ithaca, NY (United States). Dept. of Computer Science
Linear non-modal phenomena in numerical analysis and applied mathematics. First annual performance report, February 15, 1994–November 15, 1994, 20:9162 (R;US)

CQ, Inc., Homer City, PA (United States)
Development of a coal quality expert. Technical progress report No. 16, 20:7630 (R;US)

D

Danish Energy Consultants, Glostrup (Denmark)
District heating strategy plan for Lithuania. Report C. General proposals for rehabilitation projects, 20:8048 (R;DK)

Danmarks Ingenioerakademi, Lyngby (Denmark)
Membrane contactors to replace conventional scrubbers, 20:7638 (R;DK)

Danmarks Tekniske Univ., Lyngby (Denmark)
Thermoelectric power of solid oxide fuel cell materials, 20:7946 (R;DK)

Danmarks Tekniske Univ., Lyngby (Denmark). Afd. for Elektrofysik
Core scanning for Th, U and K. Problems and solutions, 20:8469 (R;DK)
Improvements in a four factor formula recipe for lattice calculations, 20:7687 (R;DK)
Potential risks of nuclear ships, 20:7784 (R;DK)

Danmarks Tekniske Univ., Lyngby (Denmark). Afd. for Fluid Mekanik
A methodology for the evaluation of lightning protection measures for wind turbine generating stations, 20:7626 (RA;DK)
Current distribution and indirect effects on a wind power generator following a lightning stroke, 20:7616 (RA;DK)
Earthing of wind farms - a report of work in progress, 20:7619 (RA;DK)
Evaluation of the damages caused by lightning current flowing through bearings, 20:7625 (RA;DK)
Experience gained in the lightning protection of aircraft and petrochemical installations applicable to wind turbine generators, 20:8239 (RA;DK)
Lightning and the impact on wind turbine generation, 20:7613 (RA;DK)

Lightning flashes to non-conductive (fibre glass) rotor blades of wind turbines, 20:7615 (RA;DK)
Lightning protection of large rotor blades design and experience, 20:7614 (RA;DK)
Lightning protection of the Fokker 100 CFRP rudder, 20:8240 (RA;DK)
Lightning protection of wind turbine generator systems and EMC problems in the associated control systems, 20:7611 (R;DK)
Lightning protection of wind turbine generator systems. Service experience from Norway and proposed solutions to reduce lightning damage, 20:7612 (RA;DK)
Lightning stroke simulation by means of a leader progression model, 20:7617 (RA;DK)
Lightning tests on windmill blades, 20:7618 (RA;DK)

Danmarks Tekniske Univ., Lyngby (Denmark). Lab. for Varmeisolering
Improvement of effect of a solar heating system, 20:7603 (R;DK;In Danish)
MF-demonstration project at Wewer's Brickyard in Helsinge, 20:7601 (R;DK)

Dansk Teknologisk Inst., Aarhus (Denmark). Miljoeteknik
Shaft furnace gasification with regard to cogeneration of heat and power. Partial report no 5 - Final report. Gasification of wood chips - test 8-9. Gasification of straw - test 10-14, 20:7550 (R;DK;In Danish)
Shaft furnace gasification with a view to to cogeneration of heat and power. Partial report no 4: Straw gasification - tests 6-7: gas washing, 20:7551 (R;DK;In Danish)

Dansk Teknologisk Inst., Taastrup (Denmark)
Daylighting in business buildings. State report, 20:7985 (R;DK;In Danish)
Optimized construction and use of flue-gas heat exchangers in the large natural gas fueled boilers, 20:7639 (R;DK;In Danish)

Danske Elvaerkers Forening, Copenhagen (Denmark)
Energy consumption in the primary agricultural activities. Branch analysis, 20:8029 (R;DK;In Danish)
Energy consumption in the primary agricultural activities. Branch analysis, 20:8030 (R;DK;In Danish)

Department of Energy, Idaho Falls, ID (United States). Idaho Operations Office
Air Emission Inventory for the Idaho National Engineering Laboratory, 1993 emissions report, 20:8434 (R;US)

Department of Energy, Morgantown, WV (United States). Morgantown Energy Technology Center
AFBC co-firing of coal and hospital waste. Quarterly progress report, May 1, 1994–July 31, 1994, 20:8045 (R;US)
Monolithic solid oxide fuel cell technology advancement for coal-based power generation. Quarterly technical progress report, January–March 1994, 20:7917 (R;US)
Road Transportable Analytical Laboratory (RTAL) system. Quarterly progress report, August 1994–October 1994, 20:8154 (R;US)

Department of Energy, Richland, WA (United States). Richland Operations Office
Limited field investigation report for the 100-HR-3 operable unit, 20:7303 (R;US)
Limited field investigation report for the 100-KR-1 operable unit, 20:7304 (R;US)
Pilot-scale treatability test plan for the 200-BP-5 operable unit, 20:7305 (R;US)
Pilot-scale treatability test plan for the 100-HR-3 operable unit, 20:7306 (R;US)

Department of Energy, Washington, DC (United States). Office of the Controller
FY 1996 Congressional budget request: Budget highlights, 20:7869 (R;US)

Dijon Univ., 21 (France)
Reliability studies by fast electronic simulation. Realization of an apparatus of configuration made by computer in function of the model to study, 20:7707 (R;FR;In French)

Diversified Operating Corp., New Raymer, CO (United States)
Improved secondary recovery demonstration for the sooner unit. 3rd Quarter technical report, calendar year 1994, June 1, 1994–September 30, 1994, 20:7215 (R;US)

Dk-Teknik, Soeborg (Denmark)
Analysis of straw and straw ashes. Part 1. Recommended methods for basic parameters, 20:7553 (R;DK)
Analysis of straw and straw ashes. Part 2. Basic parameters which demands further investigation of suitable analytical methods, 20:7554 (R;DK)
Analysis of straw and straw ashes. Part 3. Alternative characterization methods, 20:7555 (R;DK)
Analysis of straw and straw ashes. Part 4. Research and development countries concerning analysis and characterization of biomass fuels. State of the art, 20:7556 (R;DK)
Analysis of straw and straw ashes. Compilation of comments received. Part 1-4, 20:7557 (R;DK)
Interview and literature study of combustion and deposition characteristics of straw, 20:7558 (R;DK;In Danish)

Donlee Technologies, Inc., York, PA (United States)
AFBC co-firing of coal and hospital waste. Quarterly progress report, August 1, 1994–October 31, 1994, 20:7168 (R;US)

Drexel Univ., Philadelphia, PA (United States)
Development of advanced low-temperature heat transfer fluids for district heating and cooling, final report, 20:8249 (R;US)

DRI/McGraw-Hill, Lexington, MA (United States)
Reformulated gasoline study, executive summary, 20:7242 (R;US)

Drying Technology, Inc., Silsbee, TX (United States)
[DELTA T dryer/moisture control system]. Final technical report, 20:8025 (R;US)

Du Pont de Nemours (E.I.) and Co., Wilmington, DE (United States). Explosives Dept.
100 Areas weekly report, June 9, 1955, 20:7705 (R;US)
200 Area weekly report, 20:7309 (R;US)
200 Area weekly report, 20:7310 (R;US)
200 Area weekly report, 20:7308 (R;US)
300-M Area weekly report, November 4–10, 1955, Savannah River Plant, 20:7767 (R;US)

Duesseldorf Univ. (Germany)
Reactive liquid/liquid extraction of heavy metals from landfill seepage waters. Its characterisation and application, 20:8542 (R;DE;In German)

Durham Univ. (United Kingdom)
Quarks search in cosmic rays, 20:8793 (IA;IR;In English, Persian)

E

East-West Center, Honolulu, HI (United States)
Iran's petroleum policy: Current trends and the future outlook, 20:7237 (R;US)

Ecole Polytechnique Federale, Lausanne (Switzerland). Centre de Recherche en Physique des Plasma (CRPP)
Alfven eigenmodes active excitation experiments in JET, 20:9073 (RA;CH)
Intensity dependence of the third harmonic generation efficiency for high power far infrared radiation in n-silicon, 20:9075 (R;CH)
Papers presented at the 15. international conference on plasma physics and controlled nuclear fusion research, 20:9071 (R;CH)
Variable configuration plasmas in TCV, 20:9072 (RA;CH)
Wall stabilization of ideal modes in tokamaks, 20:9074 (RA;CH)

Ecotope, Inc., Seattle, WA (United States)
Field measurements of heating efficiency of electric forced-air furnaces in six manufactured homes, 20:7960 (R;US)

EG and G Energy Measurements, Inc., Pleasanton, CA (United States)
Lightweight extendable and retractable pole, 20:8243 (PA;US)

EG and G Idaho, Inc., Idaho Falls, ID (United States)
Aggradational and erosional history of the Radioactive Waste Management Complex at the Idaho National Engineering Laboratory, 20:7311 (R;US)
Buried Waste Integrated Demonstration commercialization actions plans. Volume 1, 20:9189 (R;US)
Field investigations examining the impact of supersaturated vapor expansions on turbine performance, 20:7608 (R;US)
Hazards assessment for the Waste Experimental Reduction Facility, 20:7312 (R;US)

Method of fabricating silicon carbide coatings on graphite surfaces, 20:8129 (PA;US)

Eleanor Roosevelt Inst., Denver, CO (United States)
Workshop on identification of transcribed sequences. Final report, August 15, 1993–August 14, 1994, 20:8583 (R;US)

Electric Power Research Inst., Palo Alto, CA (United States)
Electric Power Research Institute: Environmental Control Technology report to the Steering Committee, July 1994. [Monthly report], 20:7159 (R;US)
Electric Power Research Institute: Environmental Control Technology Center report to the Steering Committee, August 1994. [Monthly report], 20:7160 (R;US)

ELKRAFT A.m.b.A., Ballerup (Denmark)
Estimate of resources from wastes in Denmark, 20:7868 (R;DK;In Danish)

Energy and Environmental Research Corp., Irvine, CA (United States)
Air toxics evaluation of ABB Combustion Engineering Low-Emission Boiler Systems, 20:7174 (R;US)

Energy Management and Research Associates, Brooklyn, NY (United States)
Energy use and domestic hot water consumption - Phase 1. Final report, 20:7986 (R;US)

Energy Materials Research, Rochester Hills, MI (United States)
Float zone silicon sheet growth. Quarterly technical progress report No. 5, October 1, 1994–December 31, 1994, 20:8141 (R;US)

Engineering Computer Opteconomics, Inc., Annapolis, MD (United States)
Road Transportable Analytical Laboratory (RTAL) system. Quarterly progress report, February 1994–April 1994, 20:8344 (R;US)
Road Transportable Analytical Laboratory (RTAL) system. Quarterly progress report, May 1994–July 1994, 20:8345 (R;US)

Enviropower, Inc., Tampere (Finland)
Toms Creek Integrated Gasification Combined Cycle Demonstration Project. Quarterly progress report, July 1, 1994–September 30, 1994, 20:7106 (R;US)

Esbensen Raadgivende Ingenioerer, Soenderborg (Denmark)
Daylighting in business buildings. State report, 20:7985 (R;DK;In Danish)

European Organization for Nuclear Research, Geneva (Switzerland)
CP violation in hyperon decays: the case p-bar p → Λ-bar Λ → p-bar π^+ pπ^-, 20:8819 (R;AU)
Vacuum system design, 20:8334 (IA;XC)

EuroSim AB, Nykoeping (Sweden)
FASMON monitoring of space dependent oscillations in a BWR, 20:7706 (R;SE)

F

Ferdowsi Univ., Mashhad (Iran, Islamic Republic of)
Comparison of gluon jets and quarks jets, 20:8794 (IA;IR;In English, Persian)

Ferdowsi Univ., Mashhad (Iran, Islamic Republic of). Dept. of Physics
Quantum tunnelling and Heisenberg equation of motion, 20:8729 (IA;IR;In English, Persian)

Fermi National Accelerator Lab., Batavia, IL (United States)
A generic data exchange scheme between FITS format and C structures, 20:8690 (R;US)
A survey of surveys, 20:8689 (R;US)
B physics with CDF: Recent results and future prospects, 20:8787 (R;US)
Low-pressure micro-strip gas chamber and a search for a high-efficiency secondary-electron emitter, 20:8347 (R;US)
Measurement of the SS-OS Dijet cross-section ratio, 20:8785 (R;US)
Photon-charm production in p$\bar{p}$ collisions at $\sqrt{s}$ = 1.8 TeV, 20:8786 (R;US)
Physics capabilities of the DO upgrade detector, 20:8348 (R;US)
Search for supersymmetric $\tilde{W}_1$ and $\tilde{Z}_2$ states using the D0 detector, 20:8788 (R;US)
Study of the structure of the events produced in soft p$\bar{p}$ interactions at $\sqrt{s}$ = 1800 GeV, 20:8789 (R;US)
Top quark kinematics and mass determination, 20:8828 (R;US)
W-charge asymmetry at CDF, tests of structure functions, 20:8827 (R;US)

Fernald Environmental Restoration Management Corp., Cincinnati, OH (United States)
Integrated planning: A baseline development perspective, 20:7475 (R;US)

Fernald Environmental Restoration Management Corp., Cincinnati, OH (United States). Fernald Environmental Management Project
Implementing the theories: A fully integrated project control system that's implemented and works, 20:9132 (R;US)

Fichtner Development Engineering GmbH, Stuttgart (Germany)
Experts' opinion: Heat exchangers in power plant engineering. Pt. 1. Enhanced efficiency through the further development of heat exchanger technologies, 20:7631 (I;DE;In German)

Finnish Association for Aerosol Research, Espoo (Finland)
A laminar entrained flow reactor for the study of aerosol formation and deposition during black liquor combustion and pyrolysis, 20:7545 (RA;FI)
A model for gas exchange through stomata, 20:8438 (RA;FI)
Aerosol particle characteristics from pressurised fluidised bed coal gasification, 20:7140 (RA;FI)
Aerosols in black liquor combustion, 20:7559 (RA;FI)
Characterization of soot particles by in situ measurement with different aerosol analysis tools, 20:8477 (RA;FI)
Comparison of denuder systems, a virtual impactor and a Berner low-pressure impactor for determination of nitrate aerosol, 20:8445 (RA;FI)
Continuous method for coal fired power plant particle emission mass monitoring, 20:7637 (RA;FI)
Correlations between CN and SO_2 concentrations at Vaerrioe research station, 20:8444 (RA;FI)
Effects of nitric acid vapour on the radiative properties of convective clouds, 20:8442 (RA;FI)
Electrical agglomeration of aerosol particles, 20:8441 (RA;FI)
Electrostatic precipitator penetration function for pulverised coal combustion aerosols at different boiler loadings, 20:7150 (RA;FI)
Field studies on ash transformation during pulverized coal combustion of bituminous coal, 20:7182 (RA;FI)
Fine particle aspects of fluidized bed processes, 20:7184 (RA;FI)
High temperature gas filtration, 20:7636 (RA;FI)
Moving granular bed filter research at Delft University of Technology, 20:7141 (RA;FI)
Numerical simulation of vapour-aerosol dynamics in high temperature processes, 20:7180 (RA;FI)
On the detection efficiency of ultrafine CNC at 1-3 nm size range, 20:8446 (RA;FI)
Particle emissions from pressurized fluidized bed combustion, 20:7183 (RA;FI)
Polar stratospheric cloud formation: Nucleation and freezing mechanisms of nitric acid and sulphuric acid aerosols, 20:8443 (RA;FI)
Real scale studies on alkali metal transformations in atmospheric CFBC of coal, 20:7181 (RA;FI)
Report series in aerosol science, 20:8437 (R;FI)
Simultaneous in-situ measurements of temperature and size of burning char particles in a fluidized bed furnace by means of fiber optic pyrometry, 20:7185 (RA;FI)
The structure of combustion-generated aerosol particles, 20:8439 (RA;FI)
Theoretical studies on electrical agglomeration of a bimodal aerosol, 20:8440 (RA;FI)

Finnish Centre for Radiation and Nuclear Safety (STUK), Helsinki (Finland)
Experience of reliability of programmable control systems, 20:7632 (R;FI;In Finnish)

Fish and Wildlife Service, Portland, OR (United States). Columbia River Field Station
Significance of selective predation and development of prey protection measures for juvenile salmonids in the Columbia and Snake River Reservoirs. Annual report, February 1992–February 1993, 20:7577 (R;US)

FLS Miljoe A/S, Valby (Denmark)
Membrane contactors to replace conventional scrubbers, 20:7638 (R;DK)

Forschungszentrum Juelich GmbH (Germany). Abt. Sicherheit und Strahlenschutz
Measuring program of the Federal Republic of Germany. Results of environmental measurement in Russia, Byelorussia and Ukraine in the time from May 17 to September 2, 1993, and from October 8 to November 1, 1993, 20:8496 (R;DE;In German)
Radiation exposure due to gamma-ray submersion, 20:7753 (R;DE;In German)

Forschungszentrum Juelich GmbH (Germany). Inst. fuer Chemie 1 - Nuklearchemie
Progress report on nuclear data research in the Federal Republic of Germany for the period April 1, 1993 to March 31, 1994, 20:9138 (R;DE)

Forschungszentrum Juelich GmbH (Germany). Inst. fuer Chemie 4 - Angewandte Physikalische Chemie
Reactive liquid/liquid extraction of heavy metals from landfill seepage waters. Its characterisation and application, 20:8542 (R;DE;In German)

Forschungszentrum Juelich GmbH (Germany). Inst. fuer Kernphysik
Particle-phonon excitations in valence-neutron and valence-proton nuclei around ^{146}Gd, 20:8866 (R;DE;In German)

Forschungszentrum Juelich GmbH (Germany). Inst. fuer Sicherheitsforschung und Reaktortechnik
The chemical behaviour of iodine-129 in the process of radwaste conditioning, 20:7319 (R;DE;In German)

Forschungszentrum Juelich GmbH (Germany). Programmgruppe Systemforschung und Technologische Entwicklung
Environmental impact statements in research projects. The example of photovoltaic energy conversion. Vol. 1. Summary and results, 20:7597 (R;DE;In German)

Forschungszentrum Juelich GmbH (Germany). Projekttraeger Biologie, Energie, Oekologie
Experts' opinion: Heat exchangers in power plant engineering. Pt. 1. Enhanced efficiency through the further development of heat exchanger technologies, 20:7631 (I;DE;In German)

Foster-Wheeler Environmental Corp., Oak Ridge, TN (United States)
Design demonstrations for category B tank systems at Oak Ridge National Laboratory, Oak Ridge, Tennessee, 20:7300 (R;US)

Frankfurt Univ. (Germany)
Cross-over electron beam ion sources, 20:8316 (IA;IR;In English, Persian)

G

Gas Research Inst., Chicago, IL (United States)
Pipeline corridors through wetlands – Impacts on plant communities: Little Timber Creek Crossing, Gloucester County, New Jersey. Topical report, August 1991–January 1993, 20:7253 (R;US)

Gas Research Inst., Chicago, IL (United States). Environment and Safety Research Dept.
Pipeline corridors through wetlands - impact on plant communities: Mill Creek Tributary Crossing, Jefferson County, New York, 1991 survey. Topical report, June 1991–April 1993, 20:7252 (R;US)

Gas Research Inst., Chicago, IL (United States). Environment and Safety Research Group
Pipeline corridors through wetlands – Impacts on plant communities: Norris Brook Crossing Peabody, Massachusetts, 20:7254 (R;US)

General Atomics, San Diego, CA (United States)
Evidence for modified transport due to sheared E x B flows in high-temperature plasmas, 20:9049 (R;US)
Experimental constraints on transport, 20:9048 (R;US)

Geological Survey, Denver, CO (United States)
Geohydrologic data collected from shallow neutron-access boreholes and resultant-preliminary geohydrologic evaluations, Yucca Mountain area, Nye County, Nevada, 20:7366 (R;US)
Water levels in wells J-11 and J-12, 1989-91, Yucca Mountain Area, Nevada, 20:7454 (R;US)

Georgia Inst. of Tech., Atlanta, GA (United States). School of Chemical Engineering
High temperature electrochemical separation of H_2S from coal gasification process streams. Quarterly progress report, July 1, 1994–September 30, 1994, 20:7132 (R;US)
High temperature elkectrochemical polishing of H_2S from coal gasification process streams. Quarterly progress report, August 1, 1994–September 30, 1994, 20:7139 (R;US)

Georgia Univ., Athens, GA (United States). Complex Carbohydrate Research Center
Structural studies of complex carbohydrates of plant cell walls. Progress report, June 15, 1992–June 14, 1993, 20:8568 (R;US)

Georgia Univ., Athens, GA (United States). Research Foundation
Molecular characterization of a maize regulatory gene. Progress report, July 1989–March 1990, 20:8579 (R;US)
Molecular characterization of a maize regulatory gene. Final Progress report, November 1992–March 14, 1994, 20:8580 (R;US)
Studies of the spin-isospin response of the nuclear continuum using intermediate energy hadrons. Final technical report, May 20, 1987–April 30, 1994, 20:8907 (R;US)

Gilbert/Commonwealth, Inc., Oak Ridge, TN (United States)
Design/installation and structural integrity assessment under the Federal Facility Agreement for Bethel Valley low-level waste collection and transfer system upgrade for Building 2026 (High Radiation Level Analytical Laboratory) and Building 2099 (Monitoring and Control Station) at Oak Ridge National Laboratory, 20:7299 (R;US)

Gilfillan Engineering and Environmental Testing, Inc., Anchorage, AK (United States)
Final report on Thermally Modified Sand demonstration project, 20:8042 (R;US)

GKSS-Forschungszentrum Geesthacht GmbH (Germany). Inst. fuer Chemie
Polymer membranes for methane gas treatment, 20:7546 (R;DE;In German)
Release of dinitrous oxide from intertidal sediments - illustrated by the example of the Elbe estuary (Muehlenberger Loch) and coastal tidal region (Koenigshafen/Sylt), 20:8447 (R;DE;In German)
Volatile organic compound control technology by means of membranes, 20:8448 (R;DE)

GKSS-Forschungszentrum Geesthacht GmbH (Germany). Inst. fuer Werkstofforschung
Local quantitative phase analysis of two-phase TiAl(Cr)-alloys by analytical transmission electron microscopy, 20:8080 (R;DE;In German)

GKSS-Forschungszentrum Geesthacht GmbH (Germnay)
Inventory and sensitivity mapping in the German Wadden Sea. June 1987 - June 1993. Final report, 20:8530 (R;DE;In German)
Off-gas purification by means of membrane vapor separation systems, 20:7244 (R;DE)

Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk (Russian Federation). Fiziko-Ehnergeticheskij Inst.
Choice of cold moderator for the DIN-2PI spectrometer, 20:8346 (R;RU;In Russian)
Combined calculation of in-pile experimental devices by the Monte Carlo method, 20:7688 (R;RU;In Russian)
Constant system for by-channel thermal-hydraulic calculation of fuel assembly operational conditions in reactors with natural and mixed convection, 20:7700 (R;RU;In Russian)
Neutron resonance spin determination by the shape of capture gamma-quanta multiplicity spectrum, 20:8854 (R;RU;In Russian)
Numerical analysis of nonstationary temperature fields in central zones of nuclear reactor fuel assemblies, 20:7701 (R;RU;In Russian)
Program for calculation of two-dimensional nonstationary temperature fields in NPP arbitrary geometrical element, 20:7691 (R;RU;In Russian)
Study on space-time evolution of plasma of heavy charged particle track in noble gases, 20:8961 (R;RU;In Russian)

Technique for calculating temperature conditions for fuel elements with bilateral heat removal taking into account axial heat fluxes, 20:7699 (R;RU;In Russian)
Thermodynamical optimization of the space power plants on the base of criterion of specific mass in generalized design variables, 20:7679 (R;RU;In Russian)

Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov (Russian Federation). Inst. Fiziki Vysokikh Ehnergij
Algorithm for model-based diagnosis of the beam line, 20:8314 (R;RU;In Russian)
Beam tests of 'Spacal' type modules for a high pressure gas calorimeter, 20:8370 (R;RU)
Cable connection between the detector and low-noise amplifier as an alternative of the radiation-resistant amplifiers, 20:8369 (R;RU;In Russian)
Hybrid discriminator for microstrip silicon detectors, 20:8368 (R;RU;In Russian)
New informative techniques in high energy physics, 20:9164 (R;RU;In Russian)
Prototype of fronted electronics for tracking detectors with high channel density, 20:8367 (R;RU;In Russian)
Search for exotic baryons with the SPHINX facility, 20:8832 (R;RU)
Status of the project on ν-detection, 20:8318 (RA;RU)

Grambling State Univ., LA (United States). Dept. of Chemistry
Effect of coal beneficiation process on rheology/atomization of coal water slurries. Quarterly progress report, August 1–October 31, 1994, 20:7143 (R;US)

Grand Accelerateur National d'Ions Lourds (GANIL), 14 - Caen (France)
1-D and 2-D processing for on-line control and data analysis assistance for the multidetector 4π INDRA, 20:8349 (R;FR;In French)
Interferometry of hard photons in heavy-ion collisions, 20:8829 (R;FR;In French)

Grenoble-1 Univ., 38 (France)
Application of active neutronic interrogation method to the line analysis in reprocessing plant, 20:7264 (R;FR;In French)

GSF - Forschungszentrum fuer Umwelt und Gesundheit GmbH, Neuherberg (Germany). Inst. fuer Strahlenschutz
Calculation of the radiation transport in rock salt using Monte Carlo methods. Final report. HAW project, 20:7314 (R;DE)

Gulliot-Vogt Associates, Inc., Metairie, LA (United States)
City of New Orleans Ammonia District Cooling Plant. Final report, 20:8043 (R;US)

H

Hahn-Meitner-Institut Berlin GmbH (Germany). Zentralabteilung Reaktor
Radiological effects of an aircraft crash into the BER II research reactor. Comparison of effects for HEU and LEU fuels, 20:7785 (R;DE;In German)

Hampton Univ., VA (United States). Dept. of Engineering
Investigation of combined SO_2/NO_x removal by Ceria sorbents. Quarterly technical progress report, July 1994–September 1994, 20:7154 (R;US)
Simultaneous removal of H_2S and NH_3 in coal gasification processes. Quarterly report, July 1, 1994–September 30, 1994, 20:7109 (R;US)

Handelshoejskolen i Aarhus (Denmark)
CO_2 taxation in the EU, 20:7846 (I;DK)

Handelshoejskolen i Aarhus (Denmark). Inst. for Erhvervs- og Samfundsbeskrivelse
CO_2 taxation in the EU, 20:7846 (I;DK)

Hannover Univ. (Germany). Fakultaet fuer Maschinenwesen
Polymer membranes for methane gas treatment, 20:7546 (R;DE;In German)

Harvard Univ., Cambridge, MA (United States). Dept. of Physics
Budget projections - 1991 through 1996 for research in high energy physics, 20:8782 (R;US)
Budget projections 1988, 1989, and 1990 for research in high energy nuclear physics, 20:8779 (R;US)
Budget projections 1989, 1990, and 1991 for research in high energy nuclear physics, 20:8780 (R;US)
Budget projections 1990, 1991, and 1992 for research in high energy nuclear physics, 20:8781 (R;US)

Houston Advanced Research Center, The Woodlands, TX (United States)
Human Genome News: Workshop on sequencing by hybridization, 20:8577 (R;US)

Hungarian Academy of Sciences, Budapest (Hungary). Central Research Inst. for Physics
Massively Parallel Processing. A need for future High Energy Physics experiments., 20:9174 (RA;HU)
Technology and applications, 20:9173 (R;HU)

Hydrocarbon Research, Inc., Princeton, NJ (United States)
Bench-scale development of coal/oil co-processing technology. Twelfth quarterly report, 1 July–30 September 1990, 20:7110 (R;US)
Catalytic multi-stage liquefaction of coal. Seventh quarterly report-final, April 1, 1994–June 30, 1994, 20:7134 (R;US)

I

Idaho Dept. of Fish and Game, Boise, ID (United States). Fisheries Research Section
Kokanee stock status and contribution of Cabinet Gorge Hatchery, Lake Pend Oreille, Idaho. Final report, 20:7575 (R;US)

Idaho Dept. of Water Resources, Boise, ID (United States)
Final report, exhaust air heat pump monitoring study, 20:8019 (R;US)

Idaho Univ., Moscow, ID (United States)
Aggradational and erosional history of the Radioactive Waste Management Complex at the Idaho National Engineering Laboratory, 20:7311 (R;US)

Idaho Univ., Moscow, ID (United States). Aquaculture Inst.
Movements of white sturgeon in Lake Roosevelt. Final report, 1988–1991, 20:7578 (R;US)

Idaho Univ., Moscow, ID (United States). Coll. of Forestry, Wildlife and Range Sciences
A handbook for small-scale densified biomass fuel (pellets) manufacturing for local markets, 20:7539 (R;US)

IIT Research Inst., Chicago, IL (United States)
Demonstration testing and evaluation of in situ soil heating. Treatability study work plan (Revision 2), 20:7301 (R;US)
Demonstration testing and evaluation of in situ soil heating. Health and safety plan (Revision 2), 20:7302 (R;US)

Illinois Dept. of Energy and Natural Resources, Springfield, IL (United States)
Removal of pyrite and trace elements from waste coal by dissolved-CO_2 flotation and chelating agents. Final technical report, September 1, 1993–August 31, 1994, 20:7098 (R;US)

Illinois Inst. of Tech., Chicago, IL (United States)
Surfactant-enhanced alkaline flooding for light oil recovery. Quarterly report, April 1–June 30, 1994, 20:7208 (R;US)
Surfactant-enhanced alkaline flooding for light oil recovery. Quarterly report, July 1–September 30, 1994, 20:7209 (R;US)

Institut Francais du Petrole (IFP), 92 - Rueil-Malmaison (France)
Hydrodenitrogenation mechanism of aromatic amines. Kinetic study and simulation, 20:7902 (R;FR;In French)

Instituto de Investigaciones Electricas, Cuernavaca (Mexico)
^{10}Be and ^{26}Al production cross sections with 12 GeV protons measured by accelerator mass spectrometry., 20:8160 (IA;MX)
9. International symposium on nuclear chemistry, radiochemistry and radiation chemistry. Abstracts, 20:8214 (I;MX)
Action of glow discharge on organic solids: primary radiation-chemical processes, formation of radical distribution, radical reactions and application., 20:8203 (IA;MX)
Alpha-particle spectrum of ^{222}Rn and its daughters using silicon surface-barrier detectors., 20:8371 (IA;MX)
Analysis of Pre colombian Mexican golden pieces by X-ray fluorescence spectrometry., 20:8161 (IA;MX)
Application of the species existence-predominance and distribution diagrams to the plutonium and americium electrodeposition., 20:8215 (IA;MX)

Approximated expression for the dispersion EPR profile., 20:8984 (IA;MX)
Characterization of MMA/LDPE copolymer films obtained by gamma radiation., 20:8206 (IA;MX)
Comparison of radiochemical and spectrophotometric detection methods for HPLC-separated Cr(III) hydrolytic species., 20:8163 (IA;MX)
Crystallite size distribution in the synthesis of γ - $LiAlO_2$, 20:8187 (IA;MX)
Determination of U-235 enrichment on uranium materials by gamma spectrometry., 20:8162 (IA;MX)
Determining uranium enrichment by gamma spectrometry., 20:8158 (IA;MX)
Effects of chain orientation on the radiation response of atactic polystyrene., 20:8209 (IA;MX)
Efficiency curve determination of Si (Li) detector., 20:8372 (IA;MX)
Elimination of organics chemicals in aqueous solutions by gamma radiation processing., 20:8205 (IA;MX)
Emission Moessbauer spectroscopic studies on mixed valence states of Fe-57 atoms produced in Co-57 labelled trinuclear cobalt-iron carboxylates., 20:8157 (IA;MX)
ESR-TRIS system as a gamma dosimeter., 20:8373 (IA;MX)
Fast reactions in the positron spur in polar solvents., 20:8968 (IA;MX)
Fast successive charge captures in the positron spur by halogenated compounds in methanol., 20:8967 (IA;MX)
Identification of irradiated mangoes by the electron spin resonance technique., 20:8204 (IA;MX)
Impedance measurement of irradiated potatoes: a method to identify radiation processing., 20:8207 (IA;MX)
Photochemical reactions of $CuInSe_2$ thin films in sulphuric acid solution., 20:8201 (IA;MX)
Photonuclear reactions of complex nuclei at intermediate energies., 20:8912 (IA;MX)
PIXE analysis setup using a proton in air beam facility at the ININ., 20:8156 (IA;MX)
PIXE analysis setup using a proton in air beam facility at the ININ., 20:8315 (IA;MX)
Positronium interactions with transition metals in sodium dodecyl sulfate micellar systems (SDS)., 20:8969 (IA;MX)
Reduction of phenols, detergents and coliform bacteria in samples of waste water by gamma radiation processing., 20:8208 (IA;MX)
Sorption of radioactive Cobalt by sepiolite., 20:8216 (IA;MX)
Spectrophotometric method for the determination of Thorium in urine using anionic resin and arsenazo (III)., 20:8159 (IA;MX)
The influence of ionizing radiation on the formation of polymeric material from aqueous malononitrile., 20:8202 (IA;MX)
The lethal effect of gamma irradiation on the meta cestode of Taenia solium in pork., 20:8613 (IA;MX)

Instituto Nacional de Investigaciones Nucleares, Mexico City (Mexico)

^{10} Be and ^{26} Al production cross sections with 12 GeV protons measured by accelerator mass spectrometry., 20:8160 (IA;MX)
9. International symposium on nuclear chemistry, radiochemistry and radiation chemistry. Abstracts, 20:8214 (I;MX)
Action of glow discharge on organic solids: primary radiation-chemical processes, formation of radical distribution, radical reactions and application., 20:8203 (IA;MX)
Alpha-particle spectrum of ^{222} Rn and its daughters using silicon surface-barrier detectors., 20:8371 (IA;MX)
Analysis of Pre colombian Mexican golden pieces by X-ray fluorescence spectrometry., 20:8161 (IA;MX)
Application of the species existence-predominance and distribution diagrams to the plutonium and americium electrodeposition., 20:8215 (IA;MX)
Approximated expression for the dispersion EPR profile., 20:8984 (IA;MX)
Characterization of MMA/LDPE copolymer films obtained by gamma radiation., 20:8206 (IA;MX)
Comparison of radiochemical and spectrophotometric detection methods for HPLC-separated Cr(III) hydrolytic species., 20:8163 (IA;MX)
Crystallite size distribution in the synthesis of γ - $LiAlO_2$, 20:8187 (IA;MX)
Determination of U-235 enrichment on uranium materials by gamma spectrometry., 20:8162 (IA;MX)
Determining uranium enrichment by gamma spectrometry., 20:8158 (IA;MX)
Effects of chain orientation on the radiation response of atactic polystyrene., 20:8209 (IA;MX)
Efficiency curve determination of Si (Li) detector., 20:8372 (IA;MX)
Elimination of organics chemicals in aqueous solutions by gamma radiation processing., 20:8205 (IA;MX)
Emission Moessbauer spectroscopic studies on mixed valence states of Fe-57 atoms produced in Co-57 labelled trinuclear cobalt-iron carboxylates., 20:8157 (IA;MX)
ESR-TRIS system as a gamma dosimeter., 20:8373 (IA;MX)
Fast reactions in the positron spur in polar solvents., 20:8968 (IA;MX)
Fast successive charge captures in the positron spur by halogenated compounds in methanol., 20:8967 (IA;MX)
Identification of irradiated mangoes by the electron spin resonance technique., 20:8204 (IA;MX)
Impedance measurement of irradiated potatoes: a method to identify radiation processing., 20:8207 (IA;MX)
Photochemical reactions of $CuInSe_2$ thin films in sulphuric acid solution., 20:8201 (IA;MX)
Photonuclear reactions of complex nuclei at intermediate energies., 20:8912 (IA;MX)
PIXE analysis setup using a proton in air beam facility at the ININ., 20:8156 (IA;MX)
PIXE analysis setup using a proton in air beam facility at the ININ., 20:8315 (IA;MX)
Positronium interactions with transition metals in sodium dodecyl sulfate micellar systems (SDS)., 20:8969 (IA;MX)
Reduction of phenols, detergents and coliform bacteria in samples of waste water by gamma radiation processing., 20:8208 (IA;MX)
Sorption of radioactive Cobalt by sepiolite., 20:8216 (IA;MX)
Spectrophotometric method for the determination of Thorium in urine using anionic resin and arsenazo (III)., 20:8159 (IA;MX)
The influence of ionizing radiation on the formation of polymeric material from aqueous malononitrile., 20:8202 (IA;MX)
The lethal effect of gamma irradiation on the meta cestode of Taenia solium in pork., 20:8613 (IA;MX)

Instituto Politecnico Nacional, Mexico City (Mexico). Escuela Superior de Ingenieria Mecanica y Electrica

Power oscillator in the Tokamaks training., 20:9053 (I;MX;In Spanish)
Study of the Reflex-Klystron., 20:8317 (I;MX;In Spanish)

Instituto Tecnologico, Toluca (Mexico)

Data acquisition system for a deuteration chamber., 20:9052 (I;MX;In Spanish)

International Atomic Energy Agency, Vienna (Austria)

A double-channelled safety critical process visualization, 20:7724 (RA;XA)
A model based diagnostic system for the identification of malfunctioning components using a constraint propagation paradigm, 20:7728 (RA;XA)
A severe accident simulator for the Paks Nuclear Power Plant, 20:7734 (RA;XA)
An expert system for diagnosing failures in the condensate system of the Laguna Verde Nuclear Power Plant, 20:7744 (RA;XA)
Application of artificial neural networks in estimation of probable accident causes in nuclear power plants, 20:7745 (RA;XA)
Application of artificial neural networks for modeling localized corrosion, 20:8229 (RA;XA)
Application of gas geochemistry in the search for different types of uranium deposits. Final report for the period 15 November 1991 - 15 March 1994, 20:7262 (R;XA)
Application of neural networks in nuclear safety analysis, 20:7641 (RA;XA)
Application of tracer dilution techniques for flow rate measurements in Sahelian Hydrology: Examples in Mali, 20:8533 (RA;XA;In French)
Basic principles of providing operator information support for power plant control of the VPBER-600 reactor plant, 20:7731 (RA;XA)
CANDU operator decision support systems: Lessons learned and future directions, 20:7715 (RA;XA)

China's nuclear power programme and the projected production and consumption of plutonium, 20:7266 (RA;XA)
Civil plutonium handling experience in the production of fuel, fuel elements and assemblies for fast reactors, 20:7676 (RA;XA)
Classification of NPP operator support systems and problems with their implementation, 20:7716 (RA;XA)
Comment on the evolution of the isotopic composition of rainfall from a squall line (Niamey, Niger), 20:8536 (RA;XA;In French)
Comment on the isotopic measures of Niger in Banankoro and of Bani in the Douna-San region, 20:8535 (RA;XA;In French)
Computer software review procedures, 20:7738 (RA;XA)
Contribution of environmental isotopes in the hydrogeological study of the Casamance's aquifers (South of Senegal), 20:8485 (RA;XA;In French)
Contribution to the chemical and environmental isotopic study of the dallol Bosso acquifers (Niger), 20:8481 (RA;XA;In French)
Creation of a computerized operator support system at Unit 5 of the Novovoronezh Nuclear Power Plant, 20:7729 (RA;XA)
Critical methodological issues in evaluation of operator support systems, 20:7737 (RA;XA)
Criticality accidents and simplified estimation of total fission number, 20:7276 (RA;XA)
Current practices and future trends in expert system developments for use in the nuclear industry. Report of a specialists meeting held in Tel Aviv, Israel, 11-15 October 1993, 20:7739 (R;XA)
Development of a nuclear fuel reload pattern design system based on heuristic search methods, 20:7645 (RA;XA)
Development of an advanced man-machine system for Japanese PWR plants, 20:7732 (RA;XA)
Development of hydrogeological isotopic techniques in Sahelian countries. General framework and realization of regional project RAF/8/012 (Senegal, Mali, Niger, Cameroon), 20:8478 (RA;XA;In French)
Enhancement of verification and validation for nuclear reactors through artificial intelligence, 20:7736 (RA;XA)
Environmental isotopic study of the Korama aquifers, south of Zinder (Niger), 20:8483 (RA;XA;In French)
Environmental isotopic study of the "Grand Yaere" aquifers (North-Cameroon), 20:8484 (RA;XA;In French)
Estimation of effective recharge of aquifers under semi-arid conditions: Example in North Senegal, 20:8479 (RA;XA;In French)
Experience and benefits with diagnostic systems in German PWRs, 20:7712 (RA;XA)
Forecast reactivity program for complex loadings, 20:7717 (RA;XA)
French engineering design rules for safe handling and storage of plutonium, 20:7279 (RA;XA)
Functional design bases for a safety parameter display system for WWER-type reactors, 20:7721 (RA;XA)
Generic information display system for the control centre of the nuclear power station power unit, 20:7723 (RA;XA)
HM nuclear installation inspectorate's experience of the regulatory control of the storage, handling and transport of civil plutonium in the United Kingdom, 20:7513 (RA;XA)
IAEA co-ordinated research programme on operator support systems in nuclear power plants, 20:9197 (RA;XA)
Impact of environmental isotopes in the fissured aquifer study in Mali, 20:8482 (RA;XA;In French)
Importance of evaporation processes in the formation of the piezometric depression in Sahelian region: Hypothesis and modelling, 20:8480 (RA;XA;In French)
In situ measurements of suspended sediment transport in the wadi dourou ("pays Dogon" - Mali), 20:8487 (RA;XA;In French)
Industrial reprocessing and recycling in France: An effective plutonium management method, 20:7267 (RA;XA)
Intelligence operator support system, 20:7725 (RA;XA)
International Centre for Theoretical Physics, Trieste. Scientific activities in 1993, 20:9134 (R;XA)
Isotopic characteristics of meteoric water and groundwater in the Sahelo-Sudanese zone, 20:8532 (RA;XA;In French)
Man-machine systems in the nuclear power industry, 20:7735 (RA;XA)
Monoclonal antibody (SZ-51) specific for activated platelets is useful in the diagnosis of thrombosis. Final report for the period December 1990 - April 1994, 20:8589 (R;XA)
Natural groundwater recharge in the Garoua basin (North-Cameroon): Hydrochemical and isotopic approaches, 20:8486 (RA;XA;In French)
NPPO - TINA: Expert system for supporting the operator's decision-making process, 20:7718 (RA;XA)
Nuclear power plant diagnostics using artificial neural networks, 20:7747 (RA;XA)
On-line operator support system integrated with monitoring and diagnosis system, 20:7714 (RA;XA)
Operation support systems in nuclear power plants. Diagnostic aids: Alarm logic systems, 20:7726 (RA;XA)
Operational safety in plutonium processing workshops at the La Hague site, 20:7275 (RA;XA)
Operator support systems in nuclear power plants. Proceedings of a specialists meeting held in Moscow, Russian Federation, 17-21 May 1993, 20:7709 (R;XA)
Oxygen-18 content of modern vegetal organic matter in Senegal; relation with climatic parameters, 20:8451 (RA;XA;In French)
Plutonium arisings and utilization in the United Kingdom, 20:7274 (RA;XA)
Plutonium production and storage at BNFL Sellafield, United Kingdom, 20:7277 (RA;XA)
Plutonium transport: The UK experience - 35 years on, 20:7281 (RA;XA)
Problems concerning the accumulation of separated plutonium. Report of an advisory group meeting held in Vienna, 26-29 April 1993, 20:7265 (R:XA)
Problems concerning the accumulation of isolated plutonium - Situation in Germany, 20:7268 (RA;XA)
Problems concerning the accumulation of isolated plutonium - The Swiss situation, 20:7273 (RA;XA)
Qualitative processing of uncertainty, conflicts and redundancy in knowledge bases, 20:7742 (RA;XA)
Representation of topological and functional-logical knowledge in an expert system for probabilistic safety analysis, 20:7642 (RA;XA)
Rex: A methodology used for the structured processing of nuclear power plant operation experience feedback, principles and extension to case based reasoning, 20:7746 (RA;XA)
Russian prospects for plutonium accumulation and utilization, 20:7271 (RA;XA)
Safe handling, transport and storage of plutonium. Proceedings of a technical committee meeting held in Vienna, 18-21 October 1993, 20:7702 (R;XA)
Safety of plutonium shipments in and from France, 20:7280 (RA;XA)
Safety principles for plutonium facilities in France, 20:7786 (RA;XA)
SAMSON: Severe accident management system on-line network, 20:7743 (RA;XA)
Some safety aspects related to MOX fuel fabrication in Belgium, 20:7703 (RA;XA)
SPDS development for an RBMK unit, 20:7727 (RA;XA)
The concept of an information support system for operational personnel of operating nuclear power plants, 20:7720 (RA;XA)
The design concept of an on-line diagnosis system of a sophisticated technological object: The shell of expert diagnosis system "Dasha", 20:7722 (RA;XA)
The development of WWER monitoring and diagnostic concept, 20:7730 (RA;XA)
The necessity for and significance of nuclear fuel recycling in Japan, 20:7270 (RA;XA)
The radioactive waste safety standards (RADWASS) programme. A series of international consensus documents on the safe management and disposal of radioactive waste, 20:7316 (I;XA)
The role of plutonium in the nuclear power programme of India, 20:7269 (RA;XA)
The safety of WWER and RBMK nuclear power plants. Progress report on the IAEA extrabudgetary programme on the safety of WWER and RBMK nuclear power plants, 1992-1994, 20:7653 (R;XA)
The SPDS as a tool to improve post-accident strategy on WWER and RBMK reactors, 20:7719 (RA;XA)
The status of application of neural networks in the nuclear industry, 20:7741 (RA;XA)
The use of nuclear techniques in hydrosedimentology: Principle and application in Mali, 20:8534 (RA;XA;In French)

TIS process supervisory local area network (LAN), 20:7711 (RA;XA)
Upgrading the VERONA core monitoring system, 20:7713 (RA;XA)
Use of interview and inquiry procedures in design process for NPP control room upgrade, 20:7733 (RA;XA)
Using knowledge based systems for rams analysis and on-line operator support of nuclear power plants, 20:7740 (RA;XA)
Utilization in BN-800 fast reactors of isolated plutonium being accumulated in the Russian Federation, 20:7272 (RA;XA)
Volcanic CO_2 contribution in the geochemical and isotopic equilibrium of the TIDC in the Irhazer aquifers (Niger), 20:8488 (RA;XA;In French)
Waste management assessment and technical review programme. WATRP. An international peer review service for radioactive waste management activities, 20:7317 (I;XA)
Water resources in the Sahel. Hydrogeological and hydrological studies in West Africa by isotopic techniques. Statement of accounts of studies carried out in the framework of the project RAF/8/012: Isotopic hydrology in Sahelian countries, 20:8531 (R;XA;In French)
Westinghouse computer-based operator support systems, 20:7710 (RA;XA)

International Centre for Theoretical Physics, Trieste (Italy)
A BRST charge for non-critical $W_{2,s}$ strings, 20:8724 (R;XA)
A Monte-Carlo model of ionic transport across a solid interface, 20:8698 (R;XA)
A simple model for the dc flux transformer in layered superconductors with Josephson coupling, 20:9034 (R;XA)
A study of luminescence and absorption spectra of GaP, 20:8955 (R;XA)
Acoustomagnetoelectric effect in a superlattice, 20:8696 (R;XA)
Alloying effects of Kondo insulators, 20:8976 (R;XA)
An approximate inversion method of geoelectrical sounding data using linear and bayesian statistical approaches. Examples of Tritrivakely volcanic lake and Mahitsy area (central part of Madagascar), 20:8489 (R;XA)
Antiferromagnetic instability of heavy-fermion alloys with conduction band impurities, 20:8975 (R;XA)
Around Ratner, 20:8672 (R;XA)
Bifurcations and chaos of DNA solitonic dynamics, 20:8697 (R;XA)
Bifurcations of contracting singular cycles, 20:8666 (R;XA)
Dressing symmetry of the uniformization solution of Liouville equation, 20:8675 (R;XA)
Dynamics of an inhomogeneous anisotropic antiferromagnetic spin chain, 20:9024 (R;XA)
Effect of rouleaux size of erythrocyte on blood viscosity, 20:8700 (R;XA)
Effective chiral-spin Hamiltonian for odd-numbered coupled Heisenberg chains, 20:9020 (R;XA)
Electrical conductivity study on polythiophenes films, 20:8977 (R;XA)
Electromagnetic-gravitational conversion cross sections in external electromagnetic fields, 20:8757 (R;XA)
Electron-optical nonlinear interaction in asymmetric quantum-well laser heterostructures, 20:8694 (R;XA)
Equivalence of two non-commutative geometry approaches, 20:8723 (R;XA)
ESAA environment for seismic activity analysis, 20:8490 (R;XA)
Exact smooth classification of Hamiltonian vector fields on symplectic 2-manifolds, 20:8673 (R;XA)
Ferromagnetic Potts model in a magnetic field: Finite lattice extrapolation of the (1+1)-dimensional Hamiltonian, 20:9022 (R;XA)
Generalized deformed para-Bose oscillator and its coherent states, 20:8695 (R;XA)
Generalized Kummer surfaces and differentiable invariants of Noether-Horikawa surfaces 1, 20:8677 (R;XA)
Hamiltonian dynamics of the condensed media with spontaneously broken symmetry, 20:9023 (R;XA)
Inner- and outer-shell excitation in lithium isoelectronic sequence, 20:8952 (R;XA)
Introduction to the theory of Goyaks. Operator manifold approach to geometry and particle physics, 20:8720 (R;XA)
Irreducible Greens' Functions method in the theory of highly correlated systems, 20:9021 (R;XA)
Light-front dynamics of Chern-Simons systems, 20:8721 (R;XA)
Maximum principle for subsolutions of degenerate elliptic operators, 20:8668 (R;XA)
Method of normal coordinates in the formulation of a system with dissipation: The harmonic oscillator, 20:8667 (R;XA)
Multisite antiferromagnetic Ising spin model: Phase transition through doubling bifurcation, 20:8979 (R;XA)
New Fermi-liquid approach for the theory of disordered magnetics, 20:8699 (R;XA)
Newton Raphson method, scaling at fractal boundaries and Mathematica, 20:8669 (R;XA)
On approach to double asymptotic scaling at low x, 20:8760 (R;XA)
On hadronic production of the B_c meson, 20:8790 (R;XA)
On perturbative asymptotic of Regge trajectories, 20:8725 (R;XA)
On quantization of self-similar systems, 20:8671 (R;XA)
On the degree of approximation by Jackson type operators, 20:8678 (R;XA)
On the theory of hole propagation in an antiferromagnetic background, 20:9035 (R;XA)
Once more on the radiative corrections to the nucleon structure functions in QCD, 20:8758 (R;XA)
Preservation theorems on finite structures, 20:8693 (R;XA)
Probe transparency in a two-level medium embedded by a squeezed vacuum, 20:8956 (R;XA)
Properties of a multichannel resonant-level model, 20:9039 (R;XA)
Renormalization group analyses of particle masses in full four-generation fermion condensate scheme, 20:8756 (R;XA)
Resonant re-formation of the vacuum, 20:8722 (R;XA)
Ricci-flat Kaehler metrics on symmetric varieties, 20:8718 (R;XA)
Schwinger-boson studies of the single hole motion in a 2d quantum antiferromagnet, 20:9019 (R;XA)
Search for new physics indirect effects in $e^+e^- \rightarrow W^+W^-$ at linear colliders with polarized beams, 20:8791 (R;XA)
Signatures of virtual LSPs at the TEVATRON, 20:8831 (R;XA)
Some functional solutions of the Yang-Baxter equation, 20:8719 (R;XA)
Spectral response of a polycrystalline silicon solar cell, 20:8994 (R;XA)
Spin puzzle in nucleon, 20:8755 (R;XA)
Structure formation with majoron supermultiplet, 20:8759 (R;XA)
Study of the generalized solutions of n-body type problems with weak forces, 20:8676 (R;XA)
Supersymmetric magnetic moments sum rules and spontaneous supersymmetry breaking, 20:8830 (R;XA)
The iteration formula of the Maslov-type index theory with applications to nonlinear Hamiltonian systems, 20:8674 (R;XA)
The one-dimensional model of the off-centre potential of the fluorine ion in the NaBr lattice, 20:8978 (R;XA)
The quantum interference effect in semiconductor space charge layers studied by Feynman path integrals. General formalism and illustrative examples, 20:9040 (R;XA)
The structure of a source from interferometry measurements in heavy ion collisions, 20:8911 (R;XA)
Theoretical aspects of electron emission holography, 20:8995 (R;XA)
Tracing a planar algebraic curve, 20:8670 (R;XA)
Unitarization of Koerner-Kuroda model of electromagnetic structure of octet $1/2^+$ baryons, 20:8792 (R;XA)

Iran Univ. of Science and Technology, Teheran (Iran, Islamic Republic of)
The study of free electrons role on creation of magnetic phases in intermetallic compounds of Gd Al_2, Gd_2 In, and La_2 Al, 20:8088 (IA;IR;In English, Persian)

Iranian Physics Society, Teheran (Iran, Islamic Republic of)
A new concept to increase muon cycle rate in muon catalyzed fusion, 20:9050 (IA;IR;In English, Persian)
A review of electron scattering at intermediate energies, 20:8913 (IA;IR;In English, Persian)
Abstracts of annual physics conference of Iran 1373, Kordestan University, Sanandaj, 19 Aug - 1 Sep 1994, 20:8655 (I;IR;In English, Persian)
Analysis of relativistic free electron wave generator by plasma electrodynamics, 20:9051 (IA;IR;In English, Persian)
B to D and D to K semileptonic weak decay form factors, 20:8795 (IA;IR;In English, Persian)

Characterization of superconducting thin films by rutherford backscattering analysis, 20:8985 (IA;IR;In English, Persian)
Comparison of gluon jets and quarks jets, 20:8794 (IA;IR;In English, Persian)
Computer simulation and characterization of glow curve in contact heating of thermoluminescent detectors, 20:8374 (IA;IR;In English, Persian)
Cross-over electron beam ion sources, 20:8316 (IA;IR;In English, Persian)
Geometrical and non-geometrical constants of de sitter spacetime, 20:8728 (IA;IR;In English, Persian)
Grand canonical potential of the anyon gas, 20:8701 (IA;IR;In English, Persian)
Increase gain of volume ignition, 20:9102 (IA;IR;In English, Persian)
Investigation of the magnetic flux vortices structure in high-temperature superconductors, 20:9037 (IA;IR;In English, Persian)
Latest information on ^{104C}d, 20:8858 (IA;IR;In English, Persian)
Modulation transfer function measurement for the film-converter imaging technique in neutron radiography, 20:8945 (IA;IR;In English, Persian)
On the inhomogeneous quantum groups, 20:8726 (IA;IR;In English, Persian)
Physics and archaeology an application of nuclear analytical technique, 20:8164 (IA;IR;In English, Persian)
Quantum chains with G L q(2) symmetry, 20:8727 (IA;IR;In English, Persian)
Quantum tunnelling and Heisenberg equation of motion, 20:8729 (IA;IR;In English, Persian)
Quarks search in cosmic rays, 20:8793 (IA;IR;In English, Persian)
Screening currents in anyon superconductivity on the torus for two geometries of fixed external magnetic fields, 20:9036 (IA;IR;In English, Persian)
The boiling water reactor transfer function studies by non-linear dynamical equations, 20:7646 (IA;IR;In English, Persian)
The discovery of t quark, 20:8833 (IA;IR;In English, Persian)
The study of free electrons role on creation of magnetic phases in intermetallic compounds of Gd Al_2, Gd_2 In, and La_2 Al, 20:8088 (IA;IR;In English, Persian)
Toponium energy levels, 20:8834 (IA;IR;In English, Persian)
Vacuum polarization by solitons in (1+1) dimensions, 20:8761 (IA;IR;In English, Persian)

Ireland
Statutory Instruments No 144 of 1994. European Communities (Protection of outside workers from ionising radiation) Regulations, 1994, 20:7514 (R;IE)

Isfahan Univ. (Iran, Islamic Republic of). Dept. of Physics
Grand canonical potential of the anyon gas, 20:8701 (IA;IR;In English, Persian)
Latest information on ^{104C}d, 20:8858 (IA;IR;In English, Persian)

Isfahan Univ. of Technology (Iran, Islamic Republic of). Dept. of Physics
Investigation of the magnetic flux vortices structure in high-temperature superconductors, 20:9037 (IA;IR;In English, Persian)
Screening currents in anyon superconductivity on the torus for two geometries of fixed external magnetic fields, 20:9036 (IA;IR;In English, Persian)

Israel Atomic Energy Commission, Tel Aviv (Israel)
Research laboratories annual report 1993, 20:9133 (R;IL)

Israel Atomic Energy Commission, Tel Aviv (Israel). Licensing Div.
^{99m}Tc-Teboroxime as an alternative to ^{201}Thalium for myocardial perfusion imaging. Preliminary study, 20:8587 (RA;IL)
A computerized data-base system foe personal internal contamination results, 20:9190 (RA;IL)
A manual sample changer for a 5 inch proportional detector counting system, 20:8364 (RA;IL)
A portable planar ^{90}Sr irradiation setup for total dose testing of electronic devices, 20:8407 (RA;IL)
A practical estimation of reliability of Geiger-Mueller tubes, 20:8366 (RA;IL)
A quick quantitative evaluation of a specific radio nuclide from 'Nucleus Pulse Spectrum Analysis' spectra, 20:8362 (RA;IL)
A square 7.5 inch proportional guard detector, 20:8363 (RA;IL)
Adiabatic pair potential for charged particulates in plasma and electrolytes, 20:8692 (RA;IL)
Alpha and beta radioactivity contamination counting system, 20:8359 (RA;IL)
Application of square integrable basis functions for scattering problems. A comparison between approaches based on Toeplitz matrices and negative imaginary potentials, 20:8661 (RA;IL)
Applications of collimated airborne monitoring in radiological emergency response, 20:8450 (RA;IL)
BANKET - communication network for radiation monitoring devices, 20:8357 (RA;IL)
Blister model based on near-surface helium concentration on implanted metals, 20:8085 (RA;IL)
Changes in surface topography of Fcc metals due to helium bombardment, 20:9098 (RA;IL)
Characteristics of secondary electron emission from CsI induced by X rays with energies up to 100 keV, 20:8993 (RA;IL)
Coexistence of three commensurate magnetic phases in the solid solution $U(Ni_{0.25}Cu_{0.75})_2Si_2$, observed by neutron diffraction, 20:8082 (RA;IL)
Computerized central control and supervision room, 20:7708 (RA;IL)
Defect structure and superconducting properties of $La_{1.8}Sr_xCa_{1.2-x}Cu_2O_{6-\delta}$, 20:8083 (RA;IL)
Detection limits for differential measuring methods for natural uranium, 20:8361 (RA;IL)
Development of radiation-sterilized mannitol salt agar dip slide kit, 20:8599 (RA;IL)
Digital stabilizer for multichannel analysis, 20:8365 (RA;IL)
Elastic scattering cross-sections of 11.4 MeV photons from ^{206,207,208}Pb, ^{209}Bi and ^{181}Ta, 20:8910 (RA;IL)
Enhancing XRPD pattern quality with line profile fitting in multi-phase systems, 20:8155 (RA;IL)
Evidence foe phase transitional behavior of even-even nuclei from differential observables, 20:8855 (RA;IL)
F-SPIN PURITY OF 2^+_1 states in even-even nuclei, 20:8857 (RA;IL)
g-Factor of the 3/2$^+$ 93.6 keV level of ^{91}Sr, 20:8856 (RA;IL)
Gamma radiation effects on some optical glasses, 20:8402 (RA;IL)
Generalized Van Cittert Zernike theorem in curved space time, 20:8664 (RA;IL)
Housing for on-line radioactive contamination detection unit, 20:8358 (RA;IL)
Hydrogen trapping in nickel pre-implanted with helium, 20:9101 (RA;IL)
Industrial x-ray computed tomography, 20:8588 (RA;IL)
Integral and differential cross sections foe the Li+HF->LiF+H process. A comparison between j_Z quantum mechanical and experimental results, 20:8185 (RA;IL)
$LaNi_5$ in a copper matrix, 20:8084 (RA;IL)
Magnetic ordering in $(U_{0.5}Tb_{0.5})Co_2Ge_2$, studies by ac-susceptibility and neutron-diffraction measurements, 20:8983 (RA;IL)
Magnetic properties of $U(Ni_{1-x}Cu_x)_2Si_2$ solid solutions in the vicinity of x = 0.5 studied by neutron diffraction and ac-susceptibility, 20:8121 (RA;IL)
Neutron diffraction and ac-susceptibility studies of the $U(Ni_{1-x}Cu_x)_2Si_2$ system, 20:8122 (RA;IL)
New analysis of elastic photon scattering from ^{209}Bi, 20:8909 (RA;IL)
New insight into proton-induced latchup. Experiments and modelling, 20:8404 (RA;IL)
Onsager-molecule approach to screening potentials in strongly coupled plasmas, 20:8691 (RA;IL)
Photon flux optimization in three-color multiphoton ionization of uranium atoms, 20:8954 (RA;IL)
Quantum mechanical cross sections for D+H_2 and H+D_2 reactive systems. Application of the negative imagnibnary potentials within the j_Z approximation, 20:8184 (RA;IL)
Radiation and high-field-induced interface state generation in MOS structures with modified nitrided oxide, 20:8403 (RA;IL)
Radiation Monitor (RAM) I-125, 20:8351 (RA;IL)
Radiation Monitor (RAM) ION communication with wireless monitoring system, 20:8353 (RA;IL)

Radiation Monitor (RAM) ION pressure response instrument, 20:8352 (RA;IL)
Radiation tolerance of the Offec Leo satellites. Design-policy, ground testing and flight data evaluation, 20:8408 (RA;IL)
Radiation transport and coherence in amplifying refractive systems, 20:8662 (RA;IL)
RADTEST, 20:8356 (RA;IL)
Shear-like transformation in dilute U-W alloys, 20:8087 (RA;IL)
Simulator for the A-SMG 90, 20:8355 (RA;IL)
Study of a single-event-upset in PAL16R8, 20:8406 (RA;IL)
Study of amplified spontaneous emission systems by ray-tracing technique, 20:8663 (RA;IL)
Study of the long term stability of peak 4 and 5 in the TLD-100 using computerized glow curve deconvolution and thermal peak isolation techniques. Correlation with isothermal decay measurements at elevated temperatures, 20:8350 (RA;IL)
Surface behavior of first-wall due to the synergistic effect of helium and hydrogen isotopes, 20:9100 (RA;IL)
Synergistic effect of helium and hydrogen on copper single crystal, 20:9099 (RA;IL)
The influence of preferred crystallographic orientation on blister size distribution in helium implanted surfaces, 20:8086 (RA;IL)
The Radiation Monitor (RAM-R) system, 20:8354 (RA;IL)
The use of aircraft for environmental monitoring in nuclear accidents, 20:8449 (RA;IL)
The use of microwave oven for ^{51}Cr (CrIII) complexation reactions, 20:8213 (RA;IL)
The Wolf effect in spherically symmetric systems, 20:8665 (RA;IL)
Three-dimensional quantum mechanical study of exothermic reactive systems ($F+H_2$; $Ar+h^+_2$) employing imaginary arrangement decoupling potentials, 20:8183 (RA;IL)
Three-dimensional reactive quantum mechanical study for the H_2+X_2 (X=H,D,T) systems. Application of negative imaginary arrangement decoupling potentials, 20:8186 (RA;IL)
Three-dimensional study of reactive diatom-diatom system. Quantum mechanical state-to-state cross sections for the $H_2+OX->H+OX$: X=H,D reactions, 20:8962 (RA;IL)
Track effects and their influence on heavy ion energy losses in semiconductor devices, 20:8405 (RA;IL)
Training detector as simulator of alpha detector, 20:8360 (RA;IL)
$UCoNiGe_2$ nonmagnetic solid solution of the antiferromagnets UCo_2Ge_2 and UNi_2Ge_2, 20:8081 (RA;IL)

J

Joint Inst. for Nuclear Research, Dubna (Russian Federation)
A Study of the A Dependence of the Deep Inelastic Scattering of Leptons and Implications for Understanding of the EMC Effect, 20:8796 (R;XJ)
Application of microtron braking gamma radiation to study heavy metal distribution in the process of coal burning, 20:8167 (IA;RU;In Russian)
Automatized working place of the microtron MT-25 operator, 20:8321 (IA;RU;In Russian)
Color, Colored Quarks, Quantum Chromodynamics, 20:8767 (R;XJ)
Cross section of the californium 249 photofission, 20:8919 (IA;RU;In Russian)
Dynamical Analogy of Cabibbo-Kobayashi-Maskawa Matrices, 20:8732 (R;XJ)
Free Electron Laser as Energy Driver for Inertial Confinement Fusion, 20:9105 (R;XJ)
Hydrogen content determination in alkali metals, 20:8168 (IA;RU;In Russian)
Identification of the Doubly Magic Nucleus ^{100}Sn in the Reaction ^{112}Sn (63 MeV/Nucleon) + ^{nat} Ni, 20:8914 (RA;XJ)
Investigation of Silicon Planar Detectors for LHC project, 20:8378 (R;XJ)
JINR Rapid Communications. Collection 3, 20:8375 (R;XJ)
JINR rapid communications. Collection 4, 20:8916 (R;XJ;In English, Russian)
JINR rapid communications. Collection 5, 20:7685 (R;XJ;In English, Russian)
JINR rapid communications. Collection 6, 20:8860 (R;XJ;In English, Russian)
Microtron as an injector into an electron synchrotron, 20:8319 (IA;RU)
Microtron MT-25 and its areas of use, 20:8291 (IA;RU)
Microtron MT-25. (Electromagmet design, operating experience), 20:8290 (IA;RU;In Russian)
Microtron MT-25. Workshop on application of microtrons in nuclear physics, 20:8288 (I;RU;In Russian)
MRS Silicon Avalanche Detectors with Negative Feedback for Time-of-Flight Systems, 20:8376 (RA;XJ)
Nucleon Correlation Effects on Y-Scaling Quantities in Nuclei, 20:8859 (RA;XJ)
On a possibility of application of the MT-25 microtron in the Plovdiv University, 20:8917 (IA;RU;In Russian)
On a Possibility to Construct High-Intensity Monochromatic Gamma-Source at HERA and LEP, 20:8322 (R;XJ)
Photoactivation of isomer ^{137}Ce in the region of giant dipole resonance, 20:8923 (IA;RU)
Photofission of nuclei at low excitation energies, 20:8918 (IA;RU;In Russian)
Present status on organization of nuclear-physical laboratory 'MICROTRON' in Plovdiv University, 20:8289 (IA;RU;In Russian)
Project of a laboratory for activation analysis on the basis of microtron MPR, 20:8292 (IA;RU;In Russian)
Radiation-induced synthesis and properties of fluorine-containing cation-exchange membranes, 20:8210 (IA;RU;In Russian)
Report on activity of the Joint Institute for Nuclear Research, 20:9137 (R;RU;In Russian)
State of and trends in the development of Burgas centre for electron-beam technologies and polymers, 20:7520 (IA;RU;In Russian)
Study of Features in Particle and Event Characteristics in Nucleus-Nucleus Interaction, 20:8932 (R;XJ;In Russian)
Study on the (γ, γ') reactions with population of high spin ^{180m}Hf, ^{190m}Os and ^{204m}Pb isomers, 20:8920 (IA;RU;In Russian)
Study on the photonuclear reactions with alpha particles and cluster emission in the region of giant dipole resonance, 20:8922 (IA;RU;In Russian)
The (γ, γ')-experiment at the injection for the Moscow racetrack microtron, 20:8921 (IA;RU)
The 17-orbit microtron from the Institute of Atomic Physics, Bucharest, 20:8320 (IA;RU)
The Inclusive Energy Spectra of Light Charged Particles (p, d, t, ^4He) from Spontaneous Fission of ^{248}Cm, 20:8915 (RA;XJ;In Russian)
The Possibility to Investigate J/Ψ production and Gluon Distributions Using Muon Beam of U-600, 20:8925 (R;XJ)

Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Computing Techniques and Automation
Algorithms for Events Selection in the Vertex Detector of the MPS Spectrometer, 20:9166 (R;XJ;In Russian)
Elliptic Deformed Classical Mechanics in Three-Dimensional Phase Space, 20:8679 (R;XJ)
Renormcharges in V-A Theories, 20:8798 (R;XJ)

Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of High Energy
Background Event Discrimination in Neutron Time-of-Fight Measurements at Beams of Relativistic Nuclei of the JINR synchrotron, 20:8381 (R;XJ;In Russian)
Cascades of Nuclear Interactions in Liquid Hydrogen, 20:8924 (R;XJ)
Coherent Dissociation $^{12}C \rightarrow 3\alpha$ in Emulsion Enriched by Pb, 20:8935 (R;XJ;In Russian)
Computer Simulation of Accelerator Beam Extraction with a Bent Crystal, 20:8323 (R;XJ)
Einstein's Length Concept, 20:8658 (R;XJ;In Russian)
Experimental Results on Charge Exchange Reactions with Δ Excitations and Polarization Studies of Δ and N* (1440) Resonances, 20:8926 (R;XJ)
Final State Interactions in ^3Hep-Collisions, 20:8934 (R;XJ;In Russian)
Inclusive π^0 Production in pC and pCu Interactions at 4,5 GeV/c, 20:8936 (R;XJ;In Russian)

Mechanisms of High Energy Hadron-Nucleus and Nucleus-Nucleus Collision Processes, 20:8874 (R;XJ)
MRS Silicon Avalanche Detectors with Negative Feedback for Time-of-Flight Systems, 20:8376 (RA;XJ)
Observations of Fast Hadron Passages through Intranuclear Matter, 20:8875 (R;XJ)
On Explanation of Proton Electromagnetic Form Factor Near p anti p-Threshold from the PS-170 Experiment, 20:8802 (R;XJ;In Russian)
Pion Momentum Spectra in Nuclear Charge Exchange Reactions A(t, ^{3} He), 20:8928 (R;XJ)
Polarization Observables for the Collinear dp → ^{3} Heπ^0 Reaction, 20:8927 (R;XJ)
Rapidity Distributions of Protons in (p, d, α, C)C-Interactions at 4.2 GeV/c per Nucleon, 20:8933 (R;XJ;In Russian)
Simultaneity and Length of the Moving Rod, 20:8659 (R;XJ;In Russian)
Streamer Chamber Memory Time Measurement with an Auxiliary Spark Chamber, 20:8387 (R;XJ;In Russian)
The Mechanism of Particle Production Process in Hadron-Nucleon Collisions, 20:8797 (R;XJ)
The Radiation Conditioned by the 'Velocity Part' of the Electromagnetic Field of a Moving Charge, 20:8656 (R;XJ)

Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Neutron Physics
A Wide Spectrum Neutron Polarizer for a Pulsed Neutron Source, 20:8380 (R;XJ)
Investigation of Fe_3O_4 Colloid Behaviour in a Magnetic Field by Polarized Neutron Transmission, 20:8987 (R;XJ)
New Development of a Small-Angle Neutron Scattering Instrument for a Pulsed Neutron Source, 20:8379 (R;XJ)
Production and Storage of Ultracold Neutrons at Pulse Neutron Sources with Low Repetition Rates, 20:7521 (R;XJ)
Small Angle Neutron Scattering Facility for Low and High Power Reactors, 20:8947 (R;XJ)
The Neutron Powder Diffraction and Acoustic Investigations of the NH_4SCN Phase Diagram, 20:9009 (R;XJ)

Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Problems
Design (Ge-BGO+NaI(Tl)) of Anti-Compton Spectrometer, 20:8385 (R;XJ;In Russian)
Equipment for Measurement ICE and eγ-Coincidence Spectra, 20:8383 (R;XJ;In Russian)
Experimental Study of Particle Separation in a L Kr Ionization Chamber by Multiple Measuring of dE/d x Using the Shape Analysis of Signal, 20:8377 (R;XJ)
Highly Efficient Surface Ionisation Ion Source for Ultra-Trace Detection of Quantities of Radio Toxic Strontium Isotopes, 20:8324 (R;XJ;In Russian)
Odd Proton and Neutron Shells in Light Nuclei, 20:8862 (R;XJ)
On Optical Transition Radiation of Charged Particles in SiO_2-Aerogels, 20:9010 (R;XJ;In Russian)
Parameters Calculation of Three Stage TRITRON-Type Accelerator, 20:8280 (R;XJ;In Russian)
Scintillator Based on SiO_2-Aerogel, 20:8386 (R;XJ;In Russian)
The Calculation of the Main Characteristics of Ge(Li)-NaI(Tl) Anti-Compton Spectrometer by Monte Carlo Method, 20:8384 (R;XJ;In Russian)
The Method of Decay Energy Determination for Short-Lived Nuclei in On-Line Experiments, 20:8382 (R;XJ;In Russian)
The properties of Low-Lying States of ^{166} Er, 20:8865 (R;XJ;In Russian)

Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Nuclear Reactions
Identification of the Doubly Magic Nucleus ^{100}Sn in the Reaction ^{112}Sn (63 MeV/Nucleon) + ^{nat} Ni, 20:8914 (RA;XJ)
JINR Heavy Ion Program of Low and Medium Energies, 20:8929 (R;XJ)
Nuclear Structure by Laser Spectroscopy, 20:8863 (R;XJ)
Spontaneous Fission of Light Californium Isotopes Produced in the ^{206,207,208} Pb + ^{34,36} S Reactions; New Nuclide ^{238} Cf, 20:8931 (R;XJ)
Synthesis and Properties of Superheavy Nuclei, 20:8930 (R;XJ)
The Inclusive Energy Spectra of Light Charged Particles (p, d, t, ^{4}He) from Spontaneous Fission of ^{248}Cm, 20:8915 (RA;XJ;In Russian)

Joint Inst. for Nuclear Research, Dubna (Russian Federation). Lab. of Theoretical Physics
A Queer Reduction of Degrees of Freedom, 20:8731 (R;XJ)
Electromagnetic Hadron Mass Differences and Estimation of Isotopic Symmetry Violation Parameters of QCD Vacuum from Quark Model, 20:8763 (R;XJ)
Extension of the QPM to T ≠ 0 Based on the Formalism of the Thermo Field Dynamics, 20:8861 (R;XJ)
Form Factor of the Process $\gamma^*\gamma^* \to \pi^0$ for Small Virtuality of One of the Photons and QCD Sum Rules (2): Sum Rule, 20:8764 (R;XJ)
Instability of Weak Vacuum, 20:8766 (R;XJ)
Instantaneous Chiral Quark Model for Relativistic Mesons in a Hot and Dense Medium, 20:8835 (R;XJ)
Large Scale Periodicity of the Universe and Baryogenesis, 20:8730 (R;XJ)
Multichannel Resonances in Coupled Channels of Meson Scattering: Scalar Sector, 20:8836 (R;XJ;In Russian)
Nature of Negative Parity of Collective Modes, 20:8864 (R;XJ;In Russian)
New Tensor Interaction and the K_L -K_S Mass Difference, 20:8765 (R;XJ)
New Tensor Interactions in μ - Decay, 20:8799 (R;XJ)
Nuclear Distorted Waves in High-Energy Approximation, 20:8877 (R;XJ)
Nucleon Correlation Effects on Y-Scaling Quantities in Nuclei, 20:8859 (RA;XJ)
On Explanation of Proton Electromagnetic Form Factor Near p anti p-Threshold from the PS-170 Experiment, 20:8802 (R;XJ;In Russian)
On the Compton Twist-3 Asymmetries, 20:8762 (R;XJ)
Quasi-Classical Description of Heavy Ion Reactions, 20:8876 (R;XJ)
Removal of the Energy Dependence from the Resolvent Like Energy Dependent Interactions, 20:8680 (R;XJ)
Spin Effects in pp-Scattering at Diffraction Range and RHIC Energies, 20:8800 (R;XJ)
Spin Momentum Correlation (Handedness) in the Process of Four Pion Production in the Electron-Positron Collisions, 20:8801 (R;XJ)
The Conical Singularity and Quantum Corrections to Entropy of Black Hole, 20:8657 (R;XJ)
The Interaction of Magnetizations with an External Electromagnetic Field and a Time-Dependent Magnetic Aharonov-Bohm Effect, 20:8733 (R;XJ)

Jysk Teknologisk, Aarhus (Denmark)
Shaft furnace gasification with regard to cogeneration. Partial report no. 1: Catalytic cracking of tar in synthesis gas. Bench-scale tests with hydro cracking catalysts, 20:7548 (R;DK;In Danish)

Jysk-Fynske Elsamarbejde (ELSAM), Fredericia (Denmark)
Estimate of resources from wastes in Denmark, 20:7868 (R;DK;In Danish)

K

K and A Energy Consultants, Inc., Tulsa, OK (United States)
Simulation studies to evaluate the effect of fracture closure in the performance of naturally fractured reservoirs. Third quarterly progress report, 20:7196 (R;US)
Simulation studies to evaluate the effect of fracture closure on the performance of naturally fractured reservoirs. Annual report, 20:7197 (R;US)
Simulation studies to evaluate the effect of fracture closure on the performance of naturally fractured reservoirs. Annual report, 20:7198 (R;US)

Kansas Univ. Center for Research, Inc., Lawrence, KS (United States)
Improving reservoir conformance using gelled polymer systems. Quarterly progress report, July 1–September 30, 1994, 20:7207 (R;US)

Kansas Univ., Lawrence, KS (United States). Dept. of Chemical and Petroleum Engineering
Fischer-Tropsch synthesis in supercritical reaction media. Quarterly progress report, July 1–September 31, 1994, 20:7567 (R;US)

Kansas Univ., Lawrence, KS (United States). Energy Research Center
A model technology transfer program for independent operators: Kansas Technology Transfer Model (KTTM), 20:7202 (R;US)

Karlsruhe Univ. (T.H.) (Germany). Fakultaet fuer Chemie
Study on the interaction of lithium orthosilicate with water vapor and hydrogen, 20:9122 (R;DE;In German)

Kentucky Univ., Lexington, KY (United States). Center for Applied Energy Research
Coolside waste management research. Quarterly report, July 1, 1994–September 30, 1994, 20:7633 (R;US)

Kentucky Univ., Lexington, KY (United States). Research Foundation
Evaluation of hyperbaric filtration for fine coal dewatering. Eighth quarterly technical progress report, July 1, 1994–September 30, 1994, 20:7137 (R;US)

Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Heisse Chemie
Long-term safety of radioactive waste disposal: Reaction of high burnup spent fuel and UO_2 in saline brines at room temperature, 20:8126 (R;DE)

Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Materialforschung
Compatibility of graphite with a martensitic-ferritic steel, an austenitic stainless steel and a Ni-base alloy up to 1250 C, 20:9108 (R;DE)
Fusion energy and intense neutron sources in China, 20:9118 (IA;DE)
Fusion Programme Evaluation Board, 20:9111 (IA;DE)
Material development for fusion reactors, 20:9114 (IA;DE)
Materials development for DEMO and commercial fusion reactors, 20:9112 (IA;DE)
Metallurgical and mechanical tests on the low activating martensitic chromium steel OPTIFER-IV, 20:8102 (R;DE;In German)
Mirror based fusion neutron sources for fusion material testing, 20:9121 (IA;DE)
Mirror beam plasma neutron source, 20:9120 (IA;DE)
Mirror type plasma neutron source, 20:9119 (IA;DE)
New fusion research and development stage with an experimental reactor, 20:9113 (IA;DE)
Plan of new stage fusion R and D in Japan, 20:9109 (IA;DE)
Proceedings of the IEA-workshop on intense neutron sources. IEA-implementing agreement for a programme of research and development on fusion materials. Working group task - annex II, 20:7524 (I;DE)
Proposal of an intense 14 MeV neutron source based on μCF, 20:7529 (IA;DE)
Some information and remarks concerning plans to build a European spallation source for neutron scattering application, 20:7530 (IA;DE)
Strength and elastic properties of some graphites, carbon/carbon and SiC/SiC composite materials, 20:8142 (R;DE;In German)
Summary of ESNIT, 20:7525 (IA;DE)
Summary of IEA neutron source working group activities, 20:7531 (IA;DE)
Target design analysis for an intense T-H_2O neutron source, 20:7528 (IA;DE)
The high intensity D-Li source, 20:7526 (IA;DE)
The intense T-H_2O neutron source, 20:7527 (IA;DE)
The possibilities for a staged approach in the development of intense neutron sources, 20:7532 (IA;DE)
The role of intense neutron sources and other irradiation facilities in materials development, 20:9115 (IA;DE)
The role of intense neutron sources and other irradiation facilities in materials development for fusion, 20:9117 (IA;DE)
The role of neutron irradiation facilities, 20:9116 (IA;DE)
U.S. strategy for the development of fusion reactors, 20:9110 (IA;DE)

Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Neutronenphysik und Reaktortechnik
PROSDOR: An IBM-3090 based semi-automated procedure linking HERMES MCNP and KORIGEN for the burnup analysis of accelerator driven cores, 20:7322 (R;DE)
Radiological effects of an aircraft crash into the BER II research reactor. Comparison of effects for HEU and LEU fuels, 20:7785 (R;DE;In German)

Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Nukleare Entsorgungstechnik
Long-term safety of radioactive waste disposal: Reaction of high burnup spent fuel and UO_2 in saline brines at room temperature, 20:8126 (R;DE)

Kernforschungszentrum Karlsruhe GmbH (Germany). Inst. fuer Radiochemie
Study on the interaction of lithium orthosilicate with water vapor and hydrogen, 20:9122 (R;DE;In German)

Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Kernfusion
Compatibility of graphite with a martensitic-ferritic steel, an austenitic stainless steel and a Ni-base alloy up to 1250 C, 20:9108 (R;DE)
Fusion energy and intense neutron sources in China, 20:9118 (IA;DE)
Fusion Programme Evaluation Board, 20:9111 (IA;DE)
Material development for fusion reactors, 20:9114 (IA;DE)
Materials development for DEMO and commercial fusion reactors, 20:9112 (IA;DE)
Metallurgical and mechanical tests on the low activating martensitic chromium steel OPTIFER-IV, 20:8102 (R;DE;In German)
Mirror based fusion neutron sources for fusion material testing, 20:9121 (IA;DE)
Mirror beam plasma neutron source, 20:9120 (IA;DE)
Mirror type plasma neutron source, 20:9119 (IA;DE)
New fusion research and development stage with an experimental reactor, 20:9113 (IA;DE)
Plan of new stage fusion R and D in Japan, 20:9109 (IA;DE)
Proceedings of the IEA-workshop on intense neutron sources. IEA-implementing agreement for a programme of research and development on fusion materials. Working group task - annex II, 20:7524 (I;DE)
Proposal of an intense 14 MeV neutron source based on μCF, 20:7529 (IA;DE)
Some information and remarks concerning plans to build a European spallation source for neutron scattering application, 20:7530 (IA;DE)
Strength and elastic properties of some graphites, carbon/carbon and SiC/SiC composite materials, 20:8142 (R;DE;In German)
Study on the interaction of lithium orthosilicate with water vapor and hydrogen, 20:9122 (R;DE;In German)
Summary of ESNIT, 20:7525 (IA;DE)
Summary of IEA neutron source working group activities, 20:7531 (IA;DE)
Target design analysis for an intense T-H_2O neutron source, 20:7528 (IA;DE)
The high intensity D-Li source, 20:7526 (IA;DE)
The intense T-H_2O neutron source, 20:7527 (IA;DE)
The possibilities for a staged approach in the development of intense neutron sources, 20:7532 (IA;DE)
The role of intense neutron sources and other irradiation facilities in materials development, 20:9115 (IA;DE)
The role of intense neutron sources and other irradiation facilities in materials development for fusion, 20:9117 (IA;DE)
The role of neutron irradiation facilities, 20:9116 (IA;DE)
U.S. strategy for the development of fusion reactors, 20:9110 (IA;DE)

Kernforschungszentrum Karlsruhe GmbH (Germany). Projekt Nukleare Sicherheitsforschung
Actinide burning in fast reactors. KfK contributions to the CAPRA code, 20:7321 (RA;DE;In German)
Analysis of core disruptive accidents in fast reactors, 20:7792 (RA;DE;In German)
Application of the CONTAIN code to LWRs, 20:7811 (RA;DE;In German)

Containment concepts and load carrying capacity, 20:7810 (RA;DE)
CORA results concerning LWR fuel element behaviour in the event of severe reactor accidents, 20:7793 (RA;DE;In German)
Experimental results of the CORA test program on the LWR fuel element behavior in severe reactor accidents, 20:7812 (RA;DE;In German)
Investigation of in-vessel accident sequences, 20:7815 (RA;DE;In German)
Load capacity analysis of RPV failure, 20:7805 (RA;DE;In German)
Loads affecting the reactor pressure vessel in the event of a steam explosion, 20:7796 (RA;DE;In German)
Mechanical loads on internal containment structures, 20:7804 (RA;DE;In German)
Mechanical loads on the RPV, 20:7801 (RA;DE)
Modeling and assessment of accident consequences; development of RODOS, a real-time on-line decision support system for nuclear emergencies in Europe, 20:7816 (RA;DE;In German)
Molten core cooling systems for future PWR plants, 20:7797 (RA;DE;In German)
Papers presented as part of the status report of the Nuclear Safety Research Project of the Karlsruhe Nuclear Center on 23 March 1994, 20:7788 (R;DE;In German)
Post-test examination and evaluation of the CORA experiments. Contribution to the evaluation of the CORA-W1 test bundle, 20:7813 (RA;DE;In German)
Premix experiments, 20:7800 (RA;DE;In German)
PROSDOR: An IBM-3090 based semi-automated procedure linking HERMES MCNP and KORIGEN for the burnup analysis of accelerator driven cores, 20:7322 (R;DE)
Safety requirements on future LWR plants, 20:7789 (RA;DE;In German)
Safety-related LWR research. Annual report 1993, 20:7798 (R;DE;In German, English)
Steam explosion, premixing experiments with solid spheres, 20:7802 (RA;DE;In German)
Studies into steam explosion scenarios, 20:7795 (RA;DE;In German)
Studies of core catcher concepts, 20:7806 (RA;DE;In German)
Studies of distribution and combustion of hydrogen in PWR type plants, 20:7794 (RA;DE;In German)
Studies of hydrogen distribution and combustion in PWR plants, 20:7799 (RA;DE;In German)
Studies of passive after-heat removal for fast reactors, 20:7791 (RA;DE;In German)
Technical boundary conditions for an accident filter, 20:7808 (RA;DE;In German)
The COMET concept, 20:7807 (RA;DE;In German)
The FPT O experiment of the Phebus project, 20:7814 (RA;DE;In German)
The R and D program of the Nuclear Safety Research Project, 20:7790 (RA;DE;In German)
Theoretical analyses of interactions between core melt and coolant, 20:7803 (RA;DE;In German)
Thermo-hydraulic investigations on passive containment cooling, 20:7809 (RA;DE;In German)

Kerr-McGee Coal Corp., Oklahoma City, OK (United States)
Scale-up of mild gasification to a process development unit. Quarterly report, February 1994–May 1994, 20:7103 (R;US)

Kiel Univ. (Germany). Mathematisch-Naturwissenschaftliche Fakultaet
Release of dinitrous oxide from intertidal sediments - illustrated by the example of the Elbe estuary (Muehlenberger Loch) and coastal tidal region (Koenigshafen/Sylt), 20:8447 (R;DE;In German)

Kilborn Ltd., Toronto, ON (Canada)
Economic feasibility study: CFR advanced direct coal liquefaction process. Volume 4, 20:7126 (R;US)

Koeln Univ. (Germany)
Particle-phonon excitations in valence-neutron and valence-proton nuclei around ^{146}Gd, 20:8866 (R;DE;In German)

Koeln Univ. (Germany). Mathematisch-Naturwissenschaftliche Fakultaet
Gamma spectroscopy for examination of light Ba isotopes after beta decay, 20:8869 (I;DE;In German)

Korea Cancer Center Hospital, Seoul (Korea, Republic of)
A feasibility study on the industialization of catalytic process in connection with domestic chemical plants, 20:7518 (R;KR;In Korean)
A preliminary study for the life extension of nuclear power plants, 20:7694 (R;KR;In Korean)
A study for developing training courses of the nuclear training center -with priority given to the training goals of KAERI-, 20:9139 (R;KR;In Korean)
A study on international nuclear cooperation and technology self-reliance strategies for nuclear development in other countries, 20:9146 (R;KR;In Korean)
A study on manufacturing and quality control technology of DUPIC fuel -A study on the direct use of spent PWR fuel in CANDU reactors-, 20:7668 (R;KR;In Korean)
A study on the application of the fuzzy logic controllers (II), 20:7749 (R;KR;In Korean)
A study on the change in dynamic characteristics of reactor internals, 20:7692 (R;KR;In Korean)
A study on the computerization of secondary side on-line chemistry monitoring system of PWR, 20:7661 (R;KR;In Korean)
A study on the decommissioning of research reactor, 20:7771 (R;KR;In Korean)
A study on the establishment of national nuclear foreign policy -with reference to the strategy on the NPT extension and analysis of nuclear liability-, 20:9141 (R;KR;In Korean)
A study on the establishment of severe accident experimental facility, 20:7665 (R;KR;In Korean)
A study on the irradiation effect on reactor materials using a cyclotron, 20:8263 (R;KR;In Korean)
A study on the ocean circulation and thermal diffusion near a nuclear power plant, 20:7757 (R;KR;In Korean)
A study on the polymer catalyst manufacturing technology, 20:7517 (R;KR;In Korean)
A study on the proton beam energy measurement and diagnosis, 20:8325 (R;KR;In Korean)
A study on the radiation monitoring for the personnel, 20:8617 (R;KR;In Korean)
A study on the radioactive waste management for DUPIC fuel cycle - A study on the direct use of spent PWR fuel in CANDU, 20:7320 (R;KR;In Korean)
A study on the safety measures of LMR coolant -Liquid metal reactor development-, 20:7678 (R;KR;In Korean)
A study on the status of nuclear development and utilization in North Korea, 20:9143 (R;KR;In Korean)
A study on the thermal and mechanical properties of inconel for steam generator U-tube, 20:7693 (R;KR;In Korean)
A study on the treatment of industrial wastewater containing heavy metals, 20:8170 (R;KR;In Korean)
A study on the treatment of industrial wastewater containing heavy metals, 20:8189 (R;KR;In Korean)
A study on the treatment of non-biodegrable wastewater by using radiation, 20:8211 (R;KR;In Korean)
Analysis of chemical factors affecting marine ecosystem around nuclear power plant, 20:7755 (R;KR;In Korean)
Analysis of the international environment for the national nuclear technology development in the post-coldwar era, 20:9140 (R;KR;In Korean)
Analysis of the trend in international nuclear affairs -With reference to nuclear policy development in the UK-, 20:7883 (R;KR;In Korean)
Applications of optical fiber to the remote fluorescence analysis, 20:8388 (R;KR;In Korean)
Design and analysis of CANDU advanced fuel -Development of the advanced CANDU technology-, 20:7669 (R;KR;In Korean)
Design, fabrication and installation of irradiation facilities -Advanced nuclear material development-, 20:7773 (R;KR;In Korean)
Development of 200 W class Nd:YAG laser with unstable resonator, 20:8233 (R;KR;In Korean)
Development of a Real-Time radiological dose assessment system - A study on the radiation and environmental safety -, 20:8620 (R;KR;In Korean)
Development of accident management technology and computer codes -A study for nuclear safety improvement-, 20:9170 (R;KR;In Korean)

Development of advanced CANDU PHWR -Development of the advanced CANDU technology-, 20:7673 (R;KR;In Korean)
Development of atomic spectroscopy technology, 20:8169 (R;KR;In Korean)
Development of computing code system for level 3 PSA -A study for nuclear safety improvement-, 20:7756 (R;KR;In Korean)
Development of debris resistant bottom end piece, 20:7659 (R;KR;In Korean)
Development of detection technique for fatigue crack due to thermal stratification phenomena in RCS piping, 20:7660 (R;KR;In Korean)
Development of fabrication technology for CANDU advanced fuel - Development of the advanced CANDU technology-, 20:7671 (R;KR;In Korean)
Development of fatigue monitoring system in nuclear power plants, 20:7696 (R;KR;In Korean)
Development of Hi-Tech ceramics fabrication technologies - Development of advanced nuclear materials-, 20:8125 (R;KR;In Korean)
Development of high energy radiation measurement system with diode, 20:8389 (R;KR;In Korean)
Development of high power free-electron lasers, 20:8293 (R;KR;In Korean)
Development of high power free-electron lasers, 20:8232 (R;KR;In Korean)
Development of high pressure two-phase choked flow analysis methodology in complex piping system, 20:8252 (R;KR;In Korean)
Development of industrial ion implantation technology, 20:9011 (R;KR;In Korean)
Development of laser technology (Development of the wavelength tuning and the output stabilization technology), 20:8231 (R;KR;In Korean)
Development of Long-lived radionuclide handling technology -Development of Long-lived radionuclide transmutation technology-, 20:8621 (R;KR;In Korean)
Development of Long-lived radionuclide partitioning technology -Development of Long-lived radionuclide transmutation technology, 20:8188 (R;KR;In Korean)
Development of Megawatt Demand Setter for Plant Operating Flexibility, 20:7658 (R;KR;In Korean)
Development of metallic fuel materials -Development of the advanced nuclear materials-, 20:8100 (R;KR;In Korean)
Development of non-destructive testing technology for the crack-like defects of steam generator tubes (II), 20:8262 (R;KR;In Korean)
Development of nuclear theory model for measuring and evaluating basic nuclear data, 20:9191 (R;KR;In Korean)
Development of plasma diagnostics technologies -A study on nuclear fusion reactor-, 20:9068 (R;KR;In Korean)
Development of polymer catalyst manufacturing technology, 20:7515 (R;KR;In Korean)
Development of radiation protection and measurement technology -A study on the radiation and environmental safety-, 20:8623 (R;KR;In Korean)
Development of stainless steels for nuclear power plant - Advanced nuclear materials development -, 20:8099 (R;KR;In Korean)
Development of standard logic network for PWR NSSS system design, 20:7655 (R;KR;In Korean)
Development of superconductor application technology -Advanced nuclear materials development-, 20:9038 (R;KR;In Korean)
Development of technical information processing systems, 20:9192 (R;KR;In Korean)
Development of technique on the induction and selection of in vitro mutant lines (Potato, Solanum tuberosum L.), 20:8603 (R;KR;In Korean)
Development of technology for biological dosimetry -A study on the radiation and environmental safety-, 20:8590 (R;KR;In Korean)
Development of the nuclear fuel materials for research reactor - Development of the advanced nuclear materials-, 20:7772 (R;KR;In Korean)
Development of the radioisotope production facility for the KMRR - Studies on application of radiation and radioisotopes-, 20:7774 (R;KR;In Korean)
Development of the separation and manufacturing technology for medical and industrial stable isotopes by using laser, 20:7516 (R;KR;In Korean)
Development of tokamak experiment technology -A study on the nuclear fusion reactor-, 20:9106 (R;KR;In Korean)
Development of training courses in the field of nuclear energy, 20:9199 (R;KR;In Korean)
Development of ultrasensitive spectroscopic analysis technology - Development of atomic spectroscopy technology-, 20:8988 (R;KR;In Korean)
Development on the technology for tritium removal processes (II), 20:8171 (R;KR;In Korean)
Domestic production of control parts for the nuclear waste treatment facility, 20:8390 (R;KR;In Korean)
DUPIC facility engineering -A study on the direct use of spent PWR fuel in CANDU reactors-, 20:7672 (R;KR;In Korean)
Economic analysis of nuclear power generation, 20:7860 (R;KR;In Korean)
Environmental radiation monitoring around the research reactors, 20:8618 (R;KR;In Korean)
Environmental radiation monitoring around the research reactors, 20:8619 (R;KR;In Korean)
Environmental radiation monitoring and terrestrial radioecology -A study on the radiation and environmental safety-, 20:8622 (R;KR;In Korean)
Establishment of nuclear data evaluation system (I), 20:9193 (R;KR;In Korean)
Fuel management and safety analysis -A study on the direct use of spent PWR fuel in CANDU reactors-, 20:7683 (R;KR;In Korean)
Improvement of Level-1 PSA computer code package -A study for nuclear safety improvement-, 20:9171 (R;KR;In Korean)
Inconel alloys development -Development of the advanced nuclear materials-, 20:8101 (R;KR;In Korean)
Intelligent control and automation technology for nuclear applications, 20:7748 (R;KR;In Korean)
Intelligent control and automation technology for nuclear applications, 20:7695 (R;KR;In Korean)
Liquid metal reactor development, 20:7677 (R;KR;In Korean)
Material performance evaluation -Development of the advanced nuclear materials-, 20:8264 (R;KR;In Korean)
Nuclear data evaluation and group constant generation for reactor analysis, 20:9168 (R;KR;In Korean)
Operation of the irradiation facilities, 20:7522 (R;KR;In Korean)
Overall analysis of meteorological information in the Daeduk nuclear complex, 20:9142 (R;KR;In Korean)
Research on the improvement of nuclear safety, 20:7656 (R;KR;In Korean)
Site selection of meteorological tower and environmental impact assessment of the cooling tower, 20:7754 (R;KR;In Korean)
Studies on application of radiation and radioisotopes, 20:8602 (R;KR;In Korean)
Studies on radiation processing -Studies on application of radiation and radioisotopes-, 20:7523 (R;KR;In Korean)
Studies on safety and efficacy of gamma-irradiated ginseng - Development of irradiation techniques for quality improvement of ginseng products, 20:8604 (R;KR;In Korean)
Studies on the production and application of radioisotopes - Studies on application of radiation and radioisotopes-, 20:7519 (R;KR;In Korean)
Studies on the radiation application for the development of genetic resources -Studies on application of radiation and radioisotopes-, 20:8624 (R;KR;In Korean)
Study of materials properties by neutron beam applications - Development of the advanced nuclear materials-, 20:8391 (R;KR;In Korean)
Technology development for nuclear material accountability, 20:7509 (R;KR;In Korean)
Technology development for nuclear material safeguards -A study on the direct use of spent PWR fuel in CANDU-, 20:7510 (R;KR;In Korean)
The application of irradiation techniques for food preservation and process improvement -Studies on application of radiation and radioisotopes-, 20:8605 (R;KR;In Korean)

The construction of environments for development of test and verification technology -The development of advanced instrumentation and control technology-, 20:8337 (R;KR;In Korean)
The development of a severe accident analysis code -Research on the improvement of nuclear safety-, 20:9172 (R;KR;In Korean)
The development of advanced robotics for the nuclear industry, 20:8230 (R;KR;In Korean)
The development of advanced robotic technology -The development of advanced robotics for the nuclear industry-, 20:8235 (R;KR;In Korean)
The development of human behaviour analysis techniques -The development of human factors technologies-, 20:9145 (R;KR;In Korean)
The development of human factors experimental evaluation techniques -The development of human factors technologies-, 20:7750 (R;KR;In Korean)
The development of integrated safety assessment technology, 20:7657 (R;KR;In Korean)
The development of KAERI management information system -First year: The development of manpower information management system-, 20:9167 (R;KR;In Korean)
The development of KAERI management information system (II) - The development of Time Sheet Management System-, 20:9144 (R;KR;In Korean)
The development of laser technology, 20:8702 (R;KR;In Korean)
The development of LOCA analysis codes for nuclear power plant, 20:7664 (R;KR;In Korean)
The development of nuclear fuel for the future, 20:7704 (R;KR;In Korean)
The development of nuclear plant analysis code TASS (Transients and setpoints simulation), 20:9169 (R;KR;In Korean)
The development of optimal design technology in robotics -The development of advanced robotics for the nuclear industry-, 20:8234 (R;KR;In Korean)
The development of robotic system for the nuclear power plants - The development of advanced robotics for the nuclear industry-, 20:8236 (R;KR;In Korean)
The development of the tokamak system technology -A study on the fusion reactor-, 20:9107 (R;KR;In Korean)
The effects of acute radiation exposure on the serum components, 20:8625 (R;KR;In Korean)
The establishment of master plan for developing advanced I and C technology -The development of advanced instrumentation and control technology-, 20:8336 (R;KR;In Korean)
Thermal hydraulic tests for reactor safety system -Research on the improvement of nuclear safety-, 20:7686 (R;KR;In Korean)
Thermal-hydraulic characteristics of safety systems in advanced reactors Part 1. Heat transfer in passive containment cooling system. Part 2. Fluid mixing with safety injection, 20:7690 (R;KR;In Korean)
Thermal-Hydraulics of a steam discharge system, 20:7663 (R;KR;In Korean)
Upgrade of one-dimensional core simulator ONED90, 20:7662 (R;KR;In Korean)
Verification tests for CANDU advanced fuel -Development of the advanced CANDU technology-, 20:7670 (R;KR;In Korean)

Krueger (I.) A/S, Copenhagen (Denmark)
Optimized construction and use of flue-gas heat exchangers in the large natural gas fueled boilers, 20:7639 (R;DK;In Danish)

L

Landbrugets Raadgivningscenter, Aarhus (Denmark)
Energy consumption in the primary agricultural activities. Branch analysis, 20:8029 (R;DK;In Danish)
Energy consumption in the primary agricultural activities. Branch analysis, 20:8030 (R;DK;In Danish)

Lawrence Berkeley Lab., CA (United States)
Advanced Light Source: Activity report 1993, 20:8335 (R;US)
Analysis of in-situ rock joint strength using digital borehole scanner images, 20:8651 (R;US)
Carbon monoxide oxidation over three different states of copper: Development of a model metal oxide catalyst, 20:8063 (R;US)
Charged particle detectors based on high quality amorphous silicon deposited with hydrogen or helium dilution of silane, 20:8393 (R;US)
Combined analysis of surface reflection imaging and vertical seismic profiling at Yucca Mountain, Nevada, 20:7329 (R;US)
Computer simulation of radionuclide transport through thermal convection of groundwater from borehole repositories, 20:7327 (R;US)
Design study of beam dynamics issues for 1 TeV next linear collider based upon the relativistic-klystron two-beam accelerator, 20:8304 (R;US)
Design study of longitudinal dynamics of the drive beam in 1 TeV relativistic klystron two-beam accelerator, 20:8303 (R;US)
Development of analytical and numerical models for the assessment and interpretation of hydrogeological field tests, 20:7326 (R;US)
Development of hydrogeological modelling approaches for assessment of consequences of hazardous accidents at nuclear power plants, 20:8499 (R;US)
Dynamics of TCP traffic over ATM networks, 20:9179 (R;US)
Elise - the next step in development of induction heavy ion drivers for inertial fusion energy, 20:9123 (R;US)
Evaluation .of advanced technologies for residential appliances and residential and commercial lighting, 20:7982 (R;US)
Exotic colliders, 20:8295 (R;US)
High resolution seismic imaging of Rainier Mesa using surface reflection and surface to tunnel tomography, 20:8428 (R;US)
Industrial sector energy conservation programs in the People's Republic of China during the seventh five-year plan (1986–1990), 20:8027 (R;US)
Level 1: Incidental crane operator's and incidental rigger's manual. Revision, 20:7480 (R;US)
$LuAlO_3$: A high density, high speed scintillator for gamma detection, 20:8392 (R;US)
Medical and biohazardous waste generator's guide: Revision 1, 20:8591 (R;US)
Modeling of the fault-controlled hydrothermal ore-forming systems, 20:7328 (R;US)
New vision on surface diffusion, 20:8103 (R;US)
Nonlinear optics and organic materials, 20:8705 (R;US)
Nuclear Science Division: 1993 Annual report, 20:8844 (R;US)
Parallel computation of automatic differentiation applied to magnetic field calculations, 20:8302 (R;US)
Predicting the transport properties of sedimentary rocks from microgeometry, 20:8647 (R;US)
Progress on flow visualization and relative permeability measurement in transparent replicas of natural fractures from Yucca Mountain, 20:7330 (R;US)
Recording experiment on Rainier Mesa in conjunction with a reflection survey, 20:8422 (R;US)
Seismic monitoring at the Geysers Geothermal Field, 20:7605 (R;US)
Study of $b\bar{b}$ production in e^+e^- annihilation at $\sqrt{s}$ = 29 GeV with the aid of neural networks, 20:8803 (R;US)
Supersymmetry, 20:8734 (R;US)
The cascade of reservoirs of the "Mayak" Plant: Case history and the first version of a computer simulator, 20:7479 (R;US)
The cooling of particle beams, 20:8305 (R;US)
The design and evaluation of integrated envelope and lighting control strategies for commercial buildings, 20:7981 (R;US)
Thermal modeling of the lithium/polymer battery, 20:7831 (R;US)
Toward resolving model-measurement discrepancies of radon entry into houses, 20:8460 (R;US)
Toxic volatile organic compounds in environmental tobacco smoke: Emission factors for modeling exposures of California populations, 20:8461 (R;US)
Undulators for short wavelength FEL amplifiers, 20:8270 (R;US)
Wide-area traffic: The failure of Poisson modeling, 20:9180 (R;US)

Lawrence Livermore National Lab., CA (United States)
A higher-order projection method for the simulation of unsteady turbulent nonpremixed combustion in an industrial burner, 20:8220 (R;US)
A numerical prediction of the precipitation and hydrology of California, 20:8653 (R;US)

A study of small explosions and earthquakes during 1961–1989 near the Semipalatinsk Test Site, Kazakhstan, 20:8429 (R;US)
Characterization of ultradispersed aluminum, 20:8111 (R;US)
Decision and systems analysis for underground storage tank waste retrieval systems and tank waste remediation system, 20:7364 (R;US)
Director's series on proliferation, 20:8068 (R;US)
Energy and Technology Review, 20:9129 (R;US)
Evidence for modified transport due to sheared E x B flows in high-temperature plasmas, 20:9049 (R;US)
Field-based tests of geochemical modeling codes using New Zealand hydrothermal systems, 20:7365 (R;US)
Global ocean circulation and equator-pole heat transport as a function of ocean GCM resolution, 20:8548 (R;US)
HAZEBROOK, containment data report, 20:8427 (R;US)
High temperature probe, 20:8411 (PA;US)
KERNVILLE, containment data report, 20:8426 (R;US)
Lensing duct, 20:8414 (PA;US)
Mixed Waste Management Facility Preliminary Safety Analysis Report. Chapters 1 to 20, 20:7363 (R;US)
Negative binomial fits to multiplicity distributions from central collisions of ^{16}O + Cu at 14.6A GeV/c and intermittency, 20:8880 (R;US)
Temperature-insensitive phase-matched optical harmonic conversion crystal, 20:8273 (PA;US)
The challenge of emergency response dispersion models on the meso-gamma urban scale: A case study of the July 26, 1993 Oleum tank car spill in Richmond, California, 20:8645 (R;US)

Lehigh Univ., Bethlehem, PA (United States)
High octane ethers from synthesis gas-derived alcohols. Quarterly technical progress report, January–March, 1993, 20:7564 (R;US)

Lehigh Univ., Bethlehem, PA (United States). Center for Molecular Bioscience and Biotechnology
Molecular biological enhancement of coal desulfurization: Cloning and expression of the sulfoxide/sulfone/sulfonate/sulfate genes in pseudomonads and Thiobacillae. First quarterly report, July 1989–September 1989, 20:7112 (R;US)
Molecular biological enhancement of coal desulfurization: Cloning and expression of the sulfoxide/sulfone/sulfonate/sulfate genes in pseudomonads and Thiobacillae. Third quarterly report, January 1990–March 1990, 20:7113 (R;US)

Lehigh Univ., Bethlehem, PA (United States). Dept. of Molecular Biology
Molecular biological enhancement of coal desulfurization. Final report, 20:7114 (R;US)

Lehigh Univ., Bethlehem, PA (United States). Energy Research Center
Robotic weld overlay coatings for erosion control. Quarterly technical progress report, July–September, 1994, 20:8078 (R;US)

LIFAC North America, Inc., Oakland, CA (United States)
LIFAC Sorbent Injection Desulfurization Demonstration Project. Quarterly report No. 15, April–June 1994, 20:7157 (R;US)
LIFAC Sorbent Injection Desulfurization Demonstration Project. Quarterly Report No. 16, July-September 1994, 20:7158 (R;US)

Linkoeping Univ. (Sweden). Dept. of Physics and Measurement Technology
Activity report. July 1993 - June 1994, 20:9148 (R;SE)

Little (Arthur D.), Inc., Cambridge, MA (United States)
Cross-flow, filter-sorbent-catalyst for particulate, SO_2 and NO_x control. Final report, 20:7171 (R;US)

Lomax Exploration Co., Salt Lake City, UT (United States)
Green River Formation water flood demonstration project, Uinta Basin, Utah. Quarterly technical progress report, July 1–September 30, 1994, 20:7216 (R;US)

Los Alamos National Lab., NM (United States)
A brief review of environmental transport of tritium at the Los Alamos LLRW disposal facility, 20:8498 (R;US)
A practical approach to portability and performance problems on massively parallel supercomputers, 20:9177 (R;US)
ADMPT and its synthesis, 20:8190 (PA;US)
An assessment of high-energy explosives and metal contamination in soil at TA-67 (12), L-Site, and TA-14, Q-Site, 20:8420 (R;US)
An FEL design code running on Mathcad™, 20:8294 (R;US)
Benchmark analysis of MCNP™ ENDF/B-VI iron, 20:8948 (R;US)
Calibration of neutron moisture gauges and their ability to spatially determine soil water content in environmental studies, 20:8238 (R;US)
Characterization and performance of carbon films deposited by plasma and ion beam based techniques, 20:9012 (R;US)
Chiral limit of QCD, 20:8768 (R;US)
Complex scattering dynamics and the quantum Hall effects, 20:8681 (R;US)
CONTAIN independent peer review, 20:7817 (R;US)
Distributions of 12 elements on 64 absorbers from simulated Hanford Neutralized Current Acid Waste (NCAW), 20:7323 (R;US)
Distributions of 15 elements on 58 absorbers from simulated Hanford Double-Shell Slurry Feed (DSSF), 20:7478 (R;US)
Electrochemical supercapacitors, 20:7832 (PA;US)
Environmental analysis of Lower Pueblo/Lower Los Alamos Canyon, Los Alamos, New Mexico, 20:7477 (R;US)
Funneling in LANL high intensity linac designs, 20:7325 (R;US)
Gamma-ray measurements at the WNR white neutron source, 20:8937 (R;US)
Gamma-ray production experiments at the WNR white neutron source, 20:8938 (R;US)
High explosive spot test analyses of samples from Operable Unit (OU) 1111, 20:8497 (R;US)
Hydrolysis of plutonium: Corrosion kinetics in DMSO solutions containing simulated high explosive and water, 20:8421 (R;US)
Lawrence Livermore pulsed sphere benchmark analysis of MCNP™ ENDF/B-VI, 20:8949 (R;US)
Magnetized target fusion: An ultra high energy approach in an unexplored parameter space, 20:9070 (R;US)
Method and apparatus for measuring the intensity and phase of an ultrashort light pulse, 20:8271 (PA;US)
Molecular architecture of classical cytological landmarks: Centromeres and telomeres, 20:8584 (R;US)
Parallel processing of atmospheric chemistry calculations: Preliminary considerations, 20:8458 (R;US)
Radon monitoring using long-range alpha detector-based technology, 20:8459 (R;US)
Self-consistent beam halo studies & halo diagnostic development in a continuous linear focusing channel, 20:8301 (R;US)
Soil pore-gas sampling by photoacoustic radiometry, 20:7324 (R;US)
Solution based synthesis of perovskite-type oxide films and powders, 20:8127 (R;US)
Statistical mechanics of nonlinear coherent structures: Kinks in the Φ^6 model, 20:8704 (R;US)
Synthesis of 3,6-diamino-1,2,4,5-tetrazine, 20:8423 (PA;US)
The geometry of weak solutions of certain integrable nonlinar PDE's, 20:9178 (R;US)
The influence of CDM on the dynamical estimate of Ω in the local neighborhood, 20:8703 (R;US)
Thermodynamic modeling of hydrogen fluoride production relevant to actinide residue treatment, 20:7263 (R;US)
User's guide and physics manual for the SCATPlus circuit code, 20:9176 (R;US)

Louisiana State Univ., Baton Rouge, LA (United States)
Advanced sulfur control concepts in hot-gas desulfurization technology: Phase 1, Feasibility of the direct production of elemental sulfur during the regeneration of high temperature desulfurization sorbents, 20:7107 (R;US)

Louisiana State Univ., Baton Rouge, LA (United States). Dept. of Chemical Engineering
A calcium oxide sorbent process for bulk separation of carbon dioxide, 20:7102 (R;US)

Louisiana State Univ., Baton Rouge, LA (United States). Dept. of Petroleum Engineering
Assist in the recovery of bypassed oil from reservoirs in the Gulf of Mexico. Quarterly status report (final), July 1–September 30, 1994, 20:7201 (R;US)

Luff Exploration Co., Denver, CO (United States)
Improved recovery demonstration for Williston Basin carbonates. Quarterly report, June 1–September 30, 1994, 20:7223 (R;US)

Lund Univ. (Sweden). Dept of Building Technology
Tracer gas measurement techniques. Active methods to identify volumes, air flows, flow paths and flow patterns in single family houses, 20:7983 (R;SE;In Swedish)

Lund Univ. (Sweden). Dept. of Chemical Engineering
An experimental and theoretical study of multi-cylinder paper drying, 20:8028 (R;SE)

Lund Univ. (Sweden). Dept. of Ecology
Beech (Fagus sylvatica) seedling growth and nutrition - effects of acid soils and liming, 20:8643 (R;SE)

Lund Univ. (Sweden). Dept. of Heat and Power Engineering
Impact of combustion chamber geometry on charge stratification in a CNG fueled direct injection Otto engine, 20:8058 (R;SE)
The development of diagnostic techniques for the spark discharge and the flame characteristics, applied in a lean burn spark ignition engine to examine the relations between the spark discharge, the flame, the heat release and the fluid flow, 20:8059 (R;SE)

Lund Univ. (Sweden). Dept. of Inorganic Chemistry 2
Zeolites - a high resolution electron microscopy study, 20:8128 (R;SE)

Lund Univ. (Sweden). Dept. of Nuclear Physics
Nuclear reaction analysis - Development and application, 20:8394 (R;SE)

Lund Univ. (Sweden). Dept. of Water Resources Engineering
Contaminant migration in rock aquifers, 20:7331 (R;SE)
Thermal bar dynamics. Spring thermo- and hydrodynamics in large temperate lakes, 20:8543 (R;SE)

Lyon-1 Univ., 69 - Villeurbanne (France)
Finite elements volumes methods: applications to the Navier-Stokes equations and convergence results, 20:8251 (R;FR;In French)

Lyon-1 Univ., 69 - Villeurbanne (France). Inst. de Physique Nucleaire
INPL annual report 1992-1993, 20:9147 (R;FR;In French)
Measurement of the semi-leptonic branching ratio and the baryonic contribution in b quark disintegrations, 20:8837 (R;FR;In French)

M

Manufacturing and Technology Conversion International, Inc., Santa Fe Springs, CA (United States)
Sonic enhanced ash agglomeration and sulfur capture. Technical progress report, July 1994–September 1994, 20:7152 (R;US)

Martin Marietta Astro Space, King of Prussia, PA (United States)
Electrical insulator assembly with oxygen permeation barrier, 20:7680 (PA;US)

Martin Marietta Energy Systems, Inc., Oak Ridge, TN (United States)
Environmental Restoration Information Resource Management Program Plan, 20:7474 (R;US)

Mason and Hanger-Silas Mason Co., Inc., Amarillo, TX (United States)
Environmental report for Pantex Plant, 1993, 20:7442 (R;US)

Massachusetts Inst. of Tech., Cambridge, MA (United States)
Environmental impacts of ocean disposal of CO_2. First quarterly report, September 1–September 30, 1994, 20:7856 (R;US)
Modeling of single char combustion, including CO oxidation in its boundary layer, 20:7170 (R;US)
Negative binomial fits to multiplicity distributions from central collisions of ^{16}O + Cu at 14.6A GeV/c and intermittency, 20:8880 (R;US)
[Cloning-idependent mapping technology for genomic fidelity, contig linking, C-DNA site analysis, and gene detection]. Final report, 20:8582 (R;US)

Massachusetts Inst. of Tech., Cambridge, MA (United States). Dept. of Chemical Engineering
Direct catalytic decomposition of nitric oxide. Quarterly technical progress report number 12, July–September, 1994, 20:8436 (R;US)

Massachusetts Inst. of Tech., Cambridge, MA (United States). Energy Lab.
Conversion of light hydrocarbon gases to metal carbides for production of liquid fuels and chemicals. Quarterly technical status report, July 1–September 30, 1994, 20:7248 (R;US)

Massachusetts Inst. of Tech., Cambridge, MA (United States). Plasma Fusion Center
Evidence for modified transport due to sheared E x B flows in high-temperature plasmas, 20:9049 (R;US)

Massachusetts Univ., Amherst, MA (United States). Dept. of Chemical Engineering
A general procedure for the synthesis of process flowsheets. Final report, July 16, 1991–July 31, 1993, 20:8020 (R;US)

Massachusetts Univ., Lowell, MA (United States)
Neutron scattering studies in the actinide region. Progress report, August 1, 1991–July 31, 1994, 20:8906 (R;US)

Maurer Engineering, Inc., Houston, TX (United States)
Horizontal oil well applications and oil recovery assessment. Technical progress report-final, July 1994–September 1994, 20:7204 (R;US)

Max-Planck-Institut fuer Plasmaphysik, Garching (Germany)
Nonlinear instability mechanism in 3-D collisional driftwave turbulence, 20:9054 (R;DE)

Medical Univ. of South Carolina, Charleston, SC (United States)
Environmental Hazards Assessment Program. Quarterly report, October–December 1994, 20:7853 (R;US)

Melbourne Univ., Parkville, VIC (Australia). School of Physics
A general non-perturbative estimate of the energy density of lattice Hamiltonians, 20:8742 (R;AU)
Ambiguities in strong absorption parametrisations of nuclear scattering data, 20:8939 (R;AU)
Ambiguities in strong absorption S-functions and corresponding potentials for heavy ion collisions, 20:8942 (R;AU)
Approximate analytic diagonalization of lattice QCD, 20:8773 (R;AU)
Associators in generalized octonionic maps, 20:8683 (R;AU)
Beyond the variational principle in quantum field theory, 20:8749 (R;AU)
Characterization of { 11-bar 01 } twin dislocation structures in evaporated titanium thin films by HREM, 20:8151 (R;AU)
Chiral gauge theory in four dimensions, 20:8752 (R;AU)
Complex conjugate pairs in stationary Sturmians, 20:8745 (R;AU)
Coulomb correction calculations of pp Bremsstrahlung, 20:8821 (R;AU)
Covariant phase space formulations of superparticles and supersymmetric WZW models, 20:8744 (R;AU)
CP violating effects in $e^+ e^- \rightarrow ZH$ and their optimization, 20:8747 (R;AU)
CP violation in hyperon decays: the case p-bar p $\rightarrow \Lambda$-bar $\Lambda \rightarrow$ p-bar $\pi^+ p\pi^-$, 20:8819 (R;AU)
Crystallization of sol-gel derived lead zirconate titanate thin films in argon and oxygen atmospheres, 20:8133 (R;AU)
Density dependent effective interactions, 20:8820 (R;AU)
Determination of scattering amplitudes from differential cross section data by using unitarity conditions, 20:8878 (R;AU)
Effective Lagrangian approach to the fermion mass problem, 20:8772 (R;AU)
Electroweak interactions on the lattice, 20:8750 (R;AU)
Extensions and results from a method for evaluating fractional integrals, 20:8708 (R;AU)
Inelastic plasmon and inter-band electron-scattering potentials for Si from dielectric matrix calculations, 20:9016 (R;AU)
Integrals of motion in the two Killing vector reduction of general relativity, 20:8740 (R;AU)
Interferometry with particles of non-zero rest mass: topological experiments, 20:8684 (R;AU)
Inversion of the total cross sections for electron-molecule and electron-atom scattering, 20:8964 (R;AU)
Ion implantation and thermal stress resistance of ceramics, 20:8132 (R;AU)
K-shell ionization under zone axis electron diffraction conditions, 20:9018 (R;AU)
Magneto-optical transmission-reflection beam splitter for multilevel atoms, 20:8686 (R;AU)

Measurement of de-excitation γ-rays following the photodisintegration of ^{16}O: a test of the quasi-deuteron model in photonuclear reactions above the GDR, 20:8940 (R;AU)
Multi-particle correlations in quaternionic quantum systems, 20:8707 (R;AU)
Nuclear techniques in medicine, 20:8594 (R;AU)
Orientation of rapid thermally annealed lead zirconate titanate thin films on (111) Pt substrate, 20:8135 (R;AU)
Phenomenology of the two Higgs doublet sector of a quark-lepton symmetric model, 20:8775 (R;AU)
Plaquette expansion proof and interpretation, 20:8741 (R;AU)
Polarisation resonance in X-ray diffraction, 20:8990 (R;AU)
Polarized Raman spectroscopy of chemically vapour deposited diamond films, 20:9014 (R;AU)
Possible reason why leptons are lighter than quarks, 20:8842 (R;AU)
Quantum dynamics in regions of quaternionic curvature, 20:8746 (R;AU)
Real Higgs singlet and electroweak phase transition in the standard model, 20:8771 (R;AU)
Reflection and diffraction of atomic de Broglie waves by evanescent laser waves. Bare-state method, 20:8957 (R;AU)
Relativistic non-interacting electron gas in a magnetic field, 20:9025 (R;AU)
Simulation with complex measures, 20:8774 (R;AU)
Structural investigation of xenon ion-beam-irradiated glassy carbon, 20:9015 (R;AU)
Synthesis of carbo-nitride films using high-energy shock plasma deposition, 20:8134 (R;AU)
The effect of a non-hermitian crystal potential on the scattering matrix in reflection electron diffraction, 20:9017 (R;AU)
The evaluation of specific types of integrals involving confluent hypergeometric functions, 20:8943 (R;AU)
The Foldy-Wouthuysen transformation, 20:8751 (R;AU)
The Mott-Schwinger effect in neutron elastic scattering from ^{209}Bi, 20:8941 (R;AU)
The search for the decay of Z boson into two gamma as a test of Bose statistics, 20:8822 (R;AU)
The solutions of affine and conformal affine Toda field theory, 20:8739 (R;AU)
The use of a CCD imaging system for X-ray film intensity measurement, 20:8331 (R;AU)
Top quark and Higgs boson masses from wormhole physics, 20:8841 (R;AU)
Two-loop vacuum amplitudes in a non-Abelian gauge theory on S_4, 20:8743 (R;AU)
Universality of $\Delta I = 1$ meson mixing and charge symmetry breaking, 20:8867 (R;AU)
What's wrong with anomalous chiral gauge theory?, 20:8748 (R;AU)
Zone axis backscattered electron contrast for fast electrons, 20:9013 (R;AU)

Miami Univ., Coral Gables, FL (United States)
[Circulation and exchange processes on the South Atlantic Bight Continental Shelf]. [Progress summary for 1986], 20:8524 (R;US)

Michigan State Univ., East Lansing, MI (United States)
Rate inhibition of steam gasification by adsorbed hydrogen. Quarterly technical progress report, July 1–September 30, 1994, 20:7568 (R;US)

Michigan Technological Univ., Houghton, MI (United States)
Recovery of bypassed oil in the Dundee Formation using horizontal drains. Quarterly report, 4th quarter, FY 1994, 20:7222 (R;US)

Michigan Univ., Ann Arbor, MI (United States)
Polysaccharides and bacterial plugging. Final report, 1992–1993, 20:7200 (R;US)

Michigan Univ., Ann Arbor, MI (United States). Dept. of Nuclear Engineering
Computer simulation and characterization of glow curve in contact heating of thermoluminescent detectors, 20:8374 (IA;IR;In English, Persian)

Mineraloelverbundleitung GmbH Schwedt I.G. (Germany)
Computer assisted diagnostic pig system for preventive damage detection in pipelines, 20:7243 (I;DE;In German)

Ministry of Trade and Industry, Helsinki (Finland). Energy Dept.
Heat cost allocation in Finland, 20:7980 (R;FI;In Finnish)
JALO - Fuel conversion. Final report on the energy research programme 1988-1992, 20:7547 (R;FI)
The demand for electricity is growing but what about the production?, 20:7911 (R;FI;In Finnish)

Minnesota Univ., Minneapolis, MN (United States)
Hot coal gas desulfurization with manganese-based sorbents. Final report, September 1992–December 1994, 20:7104 (R;US)
Hot coal gas desulfurization with manganese-based sorbents, 20:7105 (R;US)

Mobrand Biometrics, Inc., Vashon Island, WA (United States)
Ecosystem diagnosis and treatment planning model as applied to supplementation. Model description, user guide, and theoretical documentation for the model introduce in the summary report series on supplementation in the Columbia basin, 20:8523 (R;US)

Morgan State Univ., Baltimore, MD (United States)
Surfactant development for enhanced oil recovery. Fourth quarterly report, July 1, 1994–September 30, 1994, 20:7226 (R;US)

Moskovskij Gosudarstvennyj Univ., Moscow (Russian Federation). Nauchno-Issledovatel'skij Inst. Yadernoj Fiziki
Analysis of the composition of ion-beam irradiated elastomer using the Rutherford back scattering, 20:8166 (IA;RU;In Russian)
Boron-nitrogen interaction in silicon durins a silicon nitrogen structure formation under N^+ ion implantation, 20:9000 (IA;RU;In Russian)
Changes ib structure and properties of amorphous metallic alloys under ion irradiation, 20:8090 (IA;RU;In Russian)
Computerized simulation of rare gas ion implantation in polymer materials, 20:9006 (IA;RU;In Russian)
Crystal defect kritical concentration under crystal-amorphous state transformation of semiconductor materials, 20:8997 (IA;RU;In Russian)
Effect of high energy ions on radiation-induced defects in crystals, 20:8999 (IA;RU;In Russian)
Electric conductivity of ion implanted boron nitride, 20:8124 (IA;RU;In Russian)
Electron induced conductivity in argon ion implanted GaAs, 20:8097 (IA;RU;In Russian)
Energy dependence of radiation yield of resonance nuclear reactions prompted by channeled protons in axial and plane channels of Nb-N_x and Re-C_x systems, 20:8946 (IA;RU;In Russian)
Green profile function technique at the description of ion implantation in the case of axis channeling, 20:9005 (IA;RU;In Russian)
High intensity ion implantation: method of nitride phase formation, 20:8089 (IA;RU;In Russian)
Ion beam modification of hard alloy surfaces, 20:8123 (IA;RU;In Russian)
Ion volumetric rechanneling in heated crystal under implantation, 20:9004 (IA;RU;In Russian)
Layer-by-layer analysis of chemical composition at the interface of Fe-Pd structure irradiated with Xe^+ ions, 20:8093 (IA;RU;In Russian)
Measurement of TiN_x stoichiometry by the method of nuclear proton backscattering, 20:8986 (IA;RU;In Russian)
Mechanical properties of ion-alloyed boron-bearing materials, 20:8095 (IA;RU;In Russian)
Modification of high-chromium die steel by ion alloying, 20:8096 (IA;RU;In Russian)
Modification of properties in proton implanted silicon under heat treatment, 20:8094 (IA;RU;In Russian)
Modification of silicon near surface layer under nitrogen ion implantation, 20:9003 (IA;RU;In Russian)
On the temperature dependence of critical dose of silicon crystal-amorphous state transformation under ion implantation, 20:8998 (IA;RU;In Russian)
Photonuclear transmutation alloying of silicon monocrystals with aluminium, 20:9007 (IA;RU;In Russian)
Structural transformations in SnO_2 films bombarded by Kr^+ ions, 20:9008 (IA;RU;In Russian)
Structure changing and impurity behaviour in silicon under phosphorus 'hot' implantation and annealing, 20:8996 (IA;RU;In Russian)
Study of nitrided titanium, 20:8091 (IA;RU;In Russian)
Study of SiO_2-Si structure implanted by antimony ions, 20:9001 (IA;RU;In Russian)

Study of Ta-Si and CoSi systems implanted by boron and antimony ions, 20:9002 (IA;RU;In Russian)
Temperature dependence of microhardness for aluminium implanted with nickel ions, 20:8098 (IA;RU;In Russian)
The model of radiation-induced crystallization and amorphous layer growth in semiconductors under light ion irradiation, 20:8092 (IA;RU;In Russian)

N

National Academy of Sciences - National Research Council, Washington, DC (United States)
Water Science and Technology Board. Annual report 1992-1993, 20:8526 (R;US)
Water Science and Technology Board. Annual report 1993-1994, 20:8527 (R;US)

National Academy of Sciences, Washington, DC (United States). Ocean Studies Board
Ocean Studies Board. Annual report 1993, 20:8528 (R;US)
Ocean Studies Board. Annual report 1992, 20:8529 (R;US)

National Aeronautics and Space Administration, Cleveland, OH (United States). Lewis Research Center
Advanced Diesel Engine Component Development Program, final report - tasks 4-14, 20:8056 (R;US)

National Board of Waters and Environment, Helsinki (Finland)
Chinese-Finnish cooperative research work on dam break hydrodynamics, 20:7582 (RA;FI)
Contribution of organic acids to the acidity of Finnish lakes, 20:8549 (R;FI)
Investigation report of dam safety research in China. Report of hydraulic models, 20:7580 (R;FI)
Investigation report of dam safety research in China, 20:7581 (RA;FI)

National Chemicals Inspectorate, Solna (Sweden)
Phasing out lead and mercury, 20:7861 (R;SE)

National Defence Research Establishment, Stockholm (Sweden). Dept. of Defence Analysis
Use of Power? EPIK - Energy Problems in Wartime, 20:7887 (R;SE;In Swedish)

National Inst. for Petroleum and Energy Research, Bartlesville, OK (United States)
Field application of in situ combustion – past performance/future application: Proceedings, 20:7227 (R;US)

National Inst. of Standards and Technology (NML), Gaithersburg, MD (United States). Electron and Optical Physics Div.
Electron-atom collision studies using optically state selected beams. Progress report, May 15, 1987–May 14, 1988, 20:8959 (R;US)
Electron-atom collision studies using optically state selected beams. Progress report, May 15, 1988–May 14, 1991, 20:8960 (R;US)

National Renewable Energy Lab., Golden, CO (United States)
Amorphous silicon photovoltaic manufacturing technology - Phase 2A. Annual subcontract report, May 1, 1993–April 30, 1994, 20:7583 (R;US)
Automated solar cell assembly teamed process research. Semiannual subcontract report, December 6, 1993–June 30, 1994, 20:7584 (R;US)
Biologically produced succinic acid: A new route to chemical intermediates, 20:7543 (R;US)
Blazing the energy trail: The Municipal Energy Management Program, 20:8044 (R;US)
Broadband radiometer, 20:8413 (PA;US)
Clean fractionation of biomass, 20:7544 (R;US)
Comparison of three methods for optical characterization of point-focus concentrators, 20:7599 (R;US)
Developing a standardized test procedure for hybrid vehicles: The challenge of the SAE HEV task force, 20:8062 (R;US)
Development of a dedicated ethanol ultra-low emission vehicle (ULEV) system design, 20:8064 (R;US)
GPP user's guide - a general-purpose postprocessor for wind turbine data analysis, 20:7622 (R;US)
Hourly simulations of hybrid renewable energy systems for San Cristobal/Santa Barbara, Guatemala, 20:8049 (R;US)
Issues and methods in incorporating environmental externalities into the integrated resource planning process, 20:7863 (R;US)
Methane recovery from animal manures: A current opportunities casebook, 20:7552 (R;US)
National Renewable Energy Laboratory information resources catalogue. A collection of energy efficiency and renewable energy information resources, 20:7875 (R;US)
Overview of solar detoxification activities in the United States, 20:8463 (R;US)
Renewable Energy Demonstration Project by the National Renewable Energy Laboratory and the General Services Administration, 20:7586 (R;US)
Review of research results for the photocatalytic oxidation of hazardous wastes in air, 20:8462 (R;US)
Solar photochemistry - twenty years of progress, what's been accomplished, and where does it lead?, 20:7585 (R;US)
Technical evaluation of a dual-junction same-band-gap amorphous silicon photovoltaic system at NREL, 20:7598 (R;US)
Using digital filtering techniques as an aid in wind turbine data analysis, 20:7621 (R;US)
Wind technology development: Large and small turbines, 20:7620 (R;US)

National Research Council, Washington, DC (United States). Water Science and Technology Board
Water Science and Technology Board. Annual report 1991, 20:8525 (R;US)

Nevada Univ., Las Vegas, NV (United States). Water Resources Center
Community radiation monitoring program. Annual report, October 1, 1992–September 30, 1993, 20:8435 (R;US)
The application of borehole logging to characterize the hydrogeology of the Faultless site, Central Nevada Test Area, 20:8472 (R;US)

Nevada Univ., Reno, NV (United States). Desert Research Inst.
Classification of groundwater at the Nevada Test Site, 20:8471 (R;US)

Nevada Univ., Reno, NV (United States). Water Resources Center
Potential hydrologic characterization wells in Amargosa Valley, 20:8473 (R;US)

New Mexico Inst. of Mining and Technology, Socorro, NM (United States)
Improved efficiency of miscible CO_2 floods and enhanced prospects for CO_2 flooding heterogeneous reservoirs. Quarterly technical progress report, April 14, 1994–June 30, 1994, 20:7220 (R;US)
Improved efficiency of miscible CO_2 floods and enhanced prospects for CO_2 flooding heterogeneous reservoirs. Quarterly technical progress report, July 1, 1994–September 30, 1994, 20:7221 (R;US)
Integration of advanced geoscience and engineering techniques to quantify inter-well heterogeneity. Quarterly technical report, July 1, 1994–September 30, 1994, 20:7191 (R;US)

New York State Energy Research and Development Authority, Albany, NY (United States)
Hydrogen storage on activated carbon. Final report, 20:7536 (R;US)
Reformulated gasoline study, executive summary, 20:7242 (R;US)

New York State Energy Research and Development Authority, New York, NY (United States)
Energy use and domestic hot water consumption - Phase 1. Final report, 20:7986 (R;US)

New York Univ. Medical Center, NY (United States). Dept. of Cell Biology
Cellular morphometry and cycling cell populations of human and dog bronchi. Annual progress report, April 1, 1994–March 31, 1995, 20:8612 (R;US)

New York Univ., NY (United States). Courant Inst. of Mathematical Sciences
NYU Ultracomputer project. Final project summary, 1979-1993, 20:9161 (R;US)

Noell GmbH, Wuerzburg (Germany)
Sewage sludge pyrolysis/conversion: disposal of sewage sludge with the production of oils. Final report, 20:8046 (R;DE;In German)

Nordisk Kernesikkerhedsforskning, Roskilde (Denmark)
Nordic nuclear safety research. Project plans for the 1994 - 1997 program, 20:7818 (R;DK;In Danish, Norwegian, English, Swed)

Norges Byggforskningsinstitutt, Oslo (Norway)
Reasonably-priced low energy houses - heat recovery. New, simple system for residential ventilation, 20:7984 (R;NO;In Norwegian)

Norsk Petroleumsforening, Oslo (Norway)
Structural reliability methods for pipeline design and code calibration, 20:7245 (R;NO)
The perspectives of Norwegian petroleum resources, 20:7194 (R;NO)

North Carolina Agricultural and Technical State Univ., Greensboro, NC (United States)
Infrastructure support for the Waste Management Institute at North Carolina A&T State University. Progress report, September 1994–January 1995, 20:7307 (R;US)

North Carolina Agricultural and Technical State Univ., Greensboro, NC (United States). Dept. of Chemical Engineering
Improvement of hydrogen solubility and entrainment in hydrocracker feedstocks. Quarterly technical report, July 1, 1994–September 30, 1994, 20:7228 (R;US)

North Dakota Univ., Grand Forks, ND (United States). Energy and Environmental Research Center
Field study of circulating fluidized-bed ash. Final report, April 1986–October 1994, 20:7151 (R;US)

Nuclear Assurance Corp., Norcross, GA (United States)
A review of the scope and the cost of the Swedish nuclear waste management system, 20:7684 (R;SE)

Nuclear Consulting Services, Inc., Columbus, OH (United States)
Advanced heat pump for recovery of volatile organic compounds, Phase III - demonstration of BCSRHP mobile regenerator. Final report, 20:8024 (R;US)

Nuclear Regulatory Commission, Washington, DC (United States)
Budget estimates - fiscal years 1996-1997, 20:7682 (R;US)

Nuclear Regulatory Commission, Washington, DC (United States). Div. of Engineering Technology
Production and testing of the VITAMIN-B6 fine group and the BUGLE-93 broad-group neutron/photon cross-section libraries derived from ENDF/B-VI nuclear data, 20:7648 (R;US)

Nuclear Regulatory Commission, Washington, DC (United States). Div. of Freedom of Information and Publications Services
Regulatory and technical reports (abstract index journal): Compilation for third quarter 1994, July–September. Volume 19, Number 3, 20:7681 (R;US)

Nuclear Regulatory Commission, Washington, DC (United States). Div. of Systems Technology
Uncertainty and sensitivity analysis of food pathway results with the MACCS Reactor Accident Consequence Model, 20:8509 (R;US)

Nuclear Regulatory Commission, Washington, DC (United States). Office of Nuclear Reactor Regulation
Status of safety issues at licensed power plants: TMI Action Plan requirements, unresolved safety issues, generic safety issues, other multiplant action issues. Supplement 4, 20:7819 (R;US)

Nuclear Regulatory Commission, Washington, DC (United States). Office of Nuclear Regulatory Research
Uncertainty and sensitivity analysis of chronic exposure results with the MACCS reactor accident consequence model, 20:7820 (R;US)
Uncertainty and sensitivity analysis of early exposure results with the MACCS Reactor Accident Consequence Model, 20:7821 (R;US)

O

Oak Ridge Associated Universities, Inc., TN (United States)
Balancing radiation benefits and risks: The needs of an informed public, 20:8629 (R;US)
Biological effectiveness of neutrons: Research needs, 20:8627 (R;US)
Committee on Interagency Radiation Research and Policy Coordination 10th anniversary report, 20:8628 (R;US)
Committee on Interagency Radiation Research and Policy Coordination (CIRRPC), 20:8630 (R;US)

Oak Ridge Inst. for Science and Education, TN (United States)
Research priorities for occupational radiation protection, 20:8626 (R;US)

Oak Ridge K-25 Site, TN (United States)
Atmospheric corrosion monitoring at the US Department of Energy's Oak Ridge K-25 Site, 20:7296 (R;US)

Oak Ridge National Lab., TN (United States)
1,1,1,4,4,4 Hexafluorobutane, a new non-ozone-depleting blowing agent for rigid PUR foams, 20:8032 (RA;US)
A CO_2 vapour compression system for vehicle air conditioning, 20:8015 (RA;US)
A note on the total least squares problem for coplanar points, 20:9182 (R;US)
A phenomenological model for the effect of nanocrystalline microstructure on irradiation-induced amorphization in U_3Si, 20:8112 (R;US)
Absorption technology, 20:7994 (RA;US)
Advanced Neutron Source (ANS) Project progress report, FY 1994, 20:7533 (R;US)
Aerogels - a foam alternative, 20:7991 (RA;US)
Air cycle air conditioning and the use of ammonia in supermarket refrigeration systems, 20:8005 (RA;US)
Airborne geophysical survey of the Oak Ridge Reservation, Tennessee, 20:7445 (R;US)
Application of "natural" refrigerants: New system concepts for the use of CO_2, 20:8016 (RA;US)
Approach and strategy for performing ecological risk assessments for the U.S. Department of Energy's Oak Ridge Reservation: 1994 revision, 20:7473 (R;US)
AURA™: A fiberglass based vacuum insulation panel technology, 20:7993 (RA;US)
Bench-scale treatability studies for simulated incinerator scrubber blowdown containing radioactive cesium and strontium, 20:7335 (R;US)
Bioprocessing in nonaqueous media - critical needs and opportunities, 20:7570 (R;US)
Blowing agents: The next generation, 20:8034 (RA;US)
Bounds for departure from normality and the Frobenius norm of matrix eigenvalues, 20:9183 (R;US)
CD-ROM in the age of internet, 20:9160 (R;US)
CFC- and FHC-free refrigerators by FORON Hausgeraete Co. - a breakthrough in household refrigeration, 20:8002 (RA;US)
Cooling and air conditioning with water/zeolite, 20:7996 (RA;US)
Cyclopentane as blowing agent for rigid polyurethane foam in refrigerator insulation, 20:8035 (RA;US)
Data summary for the near-shore sediment characterization task of the Clinch River Environmental Restoration Program, 20:7483 (R;US)
Design assessment for Melton Valley liquid low-level waste collection and transfer system upgrade project at Oak Ridge National Laboratory, Oak Ridge, Tennessee, 20:7297 (R;US)
Design demonstrations for category B tank systems at Oak Ridge National Laboratory, Oak Ridge, Tennessee, 20:7300 (R;US)
Design/installation and structural integrity assessment under the Federal Facility Agreement for Bethel Valley low-level waste collection and transfer system upgrade for Building 2026 (High Radiation Level Analytical Laboratory) and Building 2099 (Monitoring and Control Station) at Oak Ridge National Laboratory, 20:7299 (R;US)
Development of a three-dimensional groundwater flow model for Western Melton Valley: Application of P-FEM on a DOE waste site, 20:7451 (R;US)
Development of evacuated panel thermal insulations, 20:7990 (RA;US)
DOLIB: Distributed Object Library, 20:9181 (R;US)
Estimating exposure of terrestrial wildlife to contaminants, 20:8641 (R;US)
Evidence for modified transport due to sheared E x B flows in high-temperature plasmas, 20:9049 (R;US)
Fall 1994 wildlife and vegetation survey, Norton Air Force Base, California, 20:8511 (R;US)
Flammable refrigerants in household refrigerators, 20:8004 (RA;US)
FY 1995 Remedial Investigation Work Plan for Waste Area Grouping 2 at Oak Ridge National Laboratory, Oak Ridge, Tennessee, 20:7298 (R;US)
Gas cooling - a worldwide overview, 20:7995 (RA;US)

Handbook of methods for the analysis of the various parameters of the carbon dioxide system in sea water. Version 2, 20:8544 (R;US)
HFC 356, a zero ODP blowing agent candidate for North American appliance foam formulations, 20:8033 (RA;US)
High density energy storage for desiccant cooling systems, 20:8001 (RA;US)
Investigation of properties and performance of ceramic composite components. Final report on Phase 2, 20:8143 (R;US)
Natures refrigerant - propane, 20:8006 (RA;US)
Neutron diffraction from $HoNi_2B_2C$. Version 1, 20:8982 (R;US)
Nuclear Medicine Program progress report for quarter ending September 30, 1994, 20:8218 (R;US)
Oak Ridge National Laboratory Core Competencies, 20:7876 (R;US)
Operating cost guidelines for benchmarking DOE thermal treatment systems for low-level mixed waste, 20:7336 (R;US)
Outdoor air and groundwater as natural sources for cooling, 20:8000 (RA;US)
Possible future directions for extruded polystyrene foam insulation, 20:7987 (RA;US)
Production and testing of the VITAMIN-B6 fine group and the BUGLE-93 broad-group neutron/photon cross-section libraries derived from ENDF/B-VI nuclear data, 20:7648 (R;US)
Progress in the standardization of DSM terminology, reporting formats, and evaluation protocols, 20:7912 (R;US)
Raman study of damage processes in Si^+-implanted GaAs, 20:8992 (R;US)
Removal of cesium from aluminum decladding wastes generated in irradiated target processing using a fixed-bed column of resorcinol-formaldehyde resin, 20:7334 (R;US)
Report of the international workshop on quality control of monthly climate data, 20:9194 (R;US)
Selection of liquid-level monitoring method for the Oak Ridge National Laboratory inactive liquid low-level waste tanks, remedial investigation/feasibility study, 20:7333 (R;US)
Statistical methods for the analysis of a screening test for chronic beryllium disease, 20:8644 (R;US)
Stirling cycle refrigerators and heat pumps, 20:7997 (RA;US)
Swiss Eco Refrigerator Project, 20:7988 (RA;US)
Synthesis of Ni_3Al and NiAl intermetallics, 20:8075 (R;US)
Technical Support Section annual work plan for FY 1995, 20:9149 (R;US)
Technology study of Gunite tank sludge mobilization at Oak Ridge National Laboratory, Oak Ridge, Tennessee, 20:7484 (R;US)
The conversion of German household-appliance refrigeration industry from CFC's to hydrocarbons and fluorocarbons in 1993, 20:8003 (RA;US)
The MBB-Vacuum Super Insulation (VSI), 20:7989 (RA;US)
Thermoacoustic refrigeration and acoustic compression, 20:7998 (RA;US)
Third annual environmental restoration monitoring and assessment report for FY 1994 of the Oak Ridge National Laboratory, Oak Ridge, Tennessee, 20:7471 (R;US)
Time dependent indentation testing at non-ambient temperatures utilizing the high temperature mechanical properties microprobe, 20:8076 (R;US)
Toxicity values from the U.S. Environmental Protection Agency Integrated Risk Information System and Health Effects Assessment Summary Table, 20:8639 (R;US)
Toxicological benchmarks for screening potential contaminants of concern for effects on soil and litter invertebrates and heterotrophic process, 20:8642 (R;US)
Toxicological benchmarks for screening potential contaminants of concern for effects on terrestrial plants: 1994 revision, 20:8640 (R;US)
Toxicological benchmarks for screening potential contaminants of concern for effects on aquatic biota: 1994 Revision, 20:8476 (R;US)
Transportation and packaging resource guide, 20:7282 (R;US)
Transportation Energy Efficiency Trends, 1972–1992, 20:8017 (R;US)
Tritium tracer movement as an analogy for pump and treat remediation, 20:7485 (R;US)
U.S. technical report for the ITER blanket/shield: A. blanket: Topical report, July 1990–November 1990, 20:9104 (R;US)
Vacuum Insulation Panels (VIPs), 20:7992 (RA;US)
Validation of the WIMSD4M cross-section generation code with benchmark results, 20:7761 (R;US)
WAG 2 remedial investigation and site investigation site-specific work plan/health and safety checklist for the sediment transport modeling task, 20:7481 (R;US)
WAG 2 remedial investigation and site investigation site-specific work plan/health and safety checklist for the ecological assessment task, Kingfisher Study, 20:7482 (R;US)
Waste generation forecast for DOE-ORO's Environmental Restoration OR-1 Project: FY 1995-FY 2002, September 1994 revision, 20:7313 (R;US)
Water as refrigerant and secondary refrigerant: Technologies for the production of chilled water and ice-slurries, 20:7999 (RA;US)
Water-blown rigid urethane foam for thermal insulation, 20:8036 (RA;US)

Oak Ridge Y-12 Plant, TN (United States)
Process monitoring using a Quality and Technical Surveillance Program, 20:8077 (R;US)

Office de Protection contre les Rayonnements Ionisants, 78 - le Vesinet (France)
Monthly results of measurements; Jun 1994, 20:8510 (R;FR;In French)

Ogden Environmental and Energy Services Co., Oak Ridge, TN (United States)
Selection of liquid-level monitoring method for the Oak Ridge National Laboratory inactive liquid low-level waste tanks, remedial investigation/feasibility study, 20:7333 (R;US)

Ohio State Univ. Research Foundation, Columbus, OH (United States)
The fifth international conference on Arabidopsis research, 20:8597 (R;US)

Oklahoma Univ., Norman, OK (United States)
Quantitation of microbial products and their effectiveness in enhanced oil recovery. Final report, 20:7199 (R;US)

Oklahoma Univ., Norman, OK (United States). Center for Reservoir Characterization
Gypsy Field project in reservoir characterization. Quarterly progress report, May 19–September 30, 1994, 20:7193 (R;US)

Oklahoma Univ., Norman, OK (United States). School of Aerospace and Mechanical Engineering
Combustion of pulverized coal in vortex structures. Quarterly progress report number 4, July 1–September 30, 1994, 20:7177 (R;US)

Oklahoma Univ., Norman, OK (United States). School of Geology and Geophysics
Organosulphur compounds in coals as determined by reaction with Raney nickel and microscale pyrolysis techniques. First quarterly report, July 1, 1994–September 30, 1994, 20:7149 (R;US)

Ontario Ministry of Energy, Toronto, ON (Canada)
Hydrogen storage on activated carbon. Final report, 20:7536 (R;US)

Oregon Dept. of Fish and Wildlife, Portland, OR (United States)
Evaluation of juvenile fish bypass and adult fish passage facilities at water diversions in the Umatilla River. Annual and interim progress report, October 1990–September 1991, 20:7573 (R;US)
Umatilla hatchery monitoring and evaluation. Annual report 1993, September 1, 1992–October 30, 1993, 20:7576 (R;US)

Oregon State Univ., Corvallis, OR (United States)
Results of the MCNP analysis of 20/20 LEU fuel for the Oregon State University TRIGA Reactor, 20:7765 (R;US)

Oregon Univ., Eugene, OR (United States). Dept. of Physics
Cryogenic helium gas convection research, 20:8250 (R;US)
Electroweak coupling measurements from polarized Bhabha scattering at the Z^0 resonance, 20:8812 (R;US)
Multiplicity moments in e^+e^- annihilation into hadrons at the Z^0 resonance, 20:8810 (R;US)

Oslo Univ. (Norway)
Use of explicit finite-difference schemes and lateral open boundary conditions in numerical ocean models, 20:8652 (R;NO)

Oxy USA, Inc., Welch, TX (United States)
Application of reservoir characterization and advanced technology to improve recovery and economic in a lower quality shallow

shelf carbonate reservoir. Third quarter 1994, August 3, 1994–September 30, 1994, 20:7225 (R;US)

P

Pacific Northwest Lab., Richland, WA (United States)
A chemical model for the major electrolyte components of the Hanford waste tanks. The binary electrolytes in the system: Na-NO_3-NO_2-SO_4-CO_3-F-PO_4-OH-Al$(OH)_4$-H_2O, 20:7348 (R;US)
A redundant, 6-DOF parallel manipulator structure with improved workspace and dexterity, 20:8244 (R;US)
A simulated countercurrent moving-bed chromatographic reactor for the oxidative coupling of methane: Experimental results, 20:7571 (R;US)
A solubility model for amorphous silica in concentrated electrolytes, 20:8192 (R;US)
A survey of existing and emerging technologies for external detection of liquid leaks at the Hanford Site, 20:7340 (R;US)
Alpha spectral analysis via artificial neural networks, 20:7453 (R;US)
Ammonia in simulated Hanford double-shell tank wastes: Solubility and effects on surface tension, 20:7339 (R;US)
Analysis of radioactive waste samples by ion chromatography-ICP/MS, 20:7352 (R;US)
Atmospheric dispersion estimates in the vicinity of buildings, 20:7760 (R;US)
Calculation of transmutation in copper and comparison with measured electrical properties, 20:8105 (R;US)
Characterization of Hanford tank wastes containing ferrocyanides, 20:7345 (R;US)
Commercial equipment cost database, 20:8037 (R;US)
Comparative study of Total Organic Carbon (TOC) methods for high-level mixed waste, 20:7346 (R;US)
Comparison of current state residential energy codes with the 1992 model energy code for one- and two-family dwellings; 1994, 20:8007 (R;US)
Computer support for cooperative tasks in Mission Operations Centers, 20:9185 (R;US)
CsI(Tl) with photodiodes for identifying subsurface radionuclide contamination, 20:8409 (R;US)
Description of electric energy use in commercial buildings in the Pacific Northwest: 1992 Supplement. End-use Load and Consumer Assessment Program (ELCAP), 20:8018 (R;US)
Differences between the 1992 and 1993 CABO Model Energy Codes, 20:8008 (R;US)
Direct measurements of transport properties are essential for site characterization, 20:7452 (R;US)
Early operating experience with large-area germanium detectors for detecting low-energy photons, 20:8633 (R;US)
Environmental Monitoring Plan, United States Department of Energy, Richland Operations Office. Revision 1, 20:7444 (R;US)
Evaluation of new and conventional thermoluminescent phosphors for environmental monitoring using automated thermoluminescent dosimeter readers, 20:8396 (R;US)
Extraction and detection of pesticide residues from air filter inserts using supercritical carbon dioxide, 20:8464 (R;US)
Final report and recommendations of the ESnet Authentication Pilot Project, 20:9184 (R;US)
Hanford Permanent Isolation Barrier Program: Asphalt technology data and status report - FY 1994, 20:7341 (R;US)
Implications of scientific and technological developments for radiation protection in the next decade, 20:8631 (R;US)
In situ tritium from Li_2O and Li_2ZrO_3 irradiated in a fast neutron flux: BEATRIX-II, Phase 1 and 2, 20:9124 (R;US)
Intercomparison of high energy neutron personnel dosimeters, 20:8395 (R;US)
K Basin spent fuel sludge treatment alternatives study. Volume 1, Regulatory options, 20:7343 (R;US)
K Basin spent fuel sludge treatment alternatives study. Volume 2, Technical options, 20:7344 (R;US)
New nanophase iron-based catalysts for hydrocracking applications, 20:7231 (R;US)
Object-oriented parallel polygon rendering, 20:9186 (R;US)
Onset time and strength of oceanic deep convection diagnosed from an ocean large-eddy simulation model, 20:8546 (R;US)
Organic destruction to enhance the separation of strontium in radioactive wastes, 20:7351 (R;US)
Parametric design using IGRIP, 20:7353 (R;US)
Radiation-induced electron migration along DNA, 20:8632 (R;US)
Raman spectroscopic studies in supercritical water, 20:8055 (R;US)
Real-time dosimetry for boron-neutron capture therapy, 20:8593 (R;US)
Rejuvenation and recovery of electroplating acids using the WADR technology, 20:8038 (R;US)
Salt splitting of sodium-dominated radioactive waste using ceramic membranes, 20:7347 (R;US)
Simulation of diurnal thermal energy storage systems: Preliminary results, 20:7600 (R;US)
Site-specific calibration of the Hanford personnel neutron dosimeter, 20:8397 (R;US)
Six-phase soil heating for enhanced removal of contaminants: Volatile organic compounds in non-arid soils integrated demonstration, Savannah River Site, 20:7486 (R;US)
Small angle X-ray scattering studies of aggregation in supercritical fluid solutions, 20:8191 (R;US)
Staff exchange with Spokane Intercollegiate Research and Technology Institute (SIRTI), final project report, 20:7878 (R;US)
Stakeholder involvement report for the Cryocell® demonstration at Hanford, 20:7864 (R;US)
Survey speeds to detect one times and three times total contamination values from U.S. Department of Energy Radiological Control Manual, Table 2-2, 20:8398 (R;US)
Tank waste processing analysis: Database development, tank-by-tank processing requirements, and examples of pretreatment sequences and schedules as applied to Hanford Double-Shell Tank Supernatant Waste - FY 1993, 20:7338 (R;US)
Tax revenue and innovations in natural gas supply: New Mexico, 20:7251 (R;US)
Team interaction skills evaluation criteria for nuclear power plant control room operators, 20:7752 (R;US)
Temperature and dose dependence of metal colloid production in alpha-irradiated CaF_2, 20:8144 (R;US)
The AMTEX Partnership™. Fourth quarter report, September 1994, 20:7877 (R;US)
The Environmental and Molecular Sciences Laboratory project – Continuous evolution in leadership, 20:7487 (R;US)
The solubility of $Cr(OH)_3$(am) in concentrated NaOH and NaOH-$NaNO_3$ solutions, 20:7349 (R;US)
Three-dimensional conceptual model for the Hanford Site unconfined aquifer system: FY 1994 status report, 20:8512 (R;US)
Two neutrino double-beta decay of ^{100}Mo to the first excited 0^+ state in ^{100}Ru, 20:8870 (R;US)
Vitrification of high sulfate wastes, 20:7350 (R;US)
Web technology in the separation of strontium and cesium from INEL-ICPP radioactive acid waste (WM-185), 20:7342 (R;US)

Pacific Science and Technology, Inc., Bend, OR (United States)
Final report, exhaust air heat pump monitoring study, 20:8019 (R;US)

Paducah Gaseous Diffusion Plant, KY (United States)
Airborne geophysical survey of the Oak Ridge Reservation, Tennessee, 20:7445 (R;US)

Pakistan Inst. of Nuclear Science and Technology, Islamabad (Pakistan). Health Physics Div.
ICP-MS as advantageous analytical technique for the determination of long-lived ^{99}Tc in the environment, 20:8173 (R;PK)
Sector emergency procedures for Pakistan Research Reactor-1 (PARR-1) PINSTECH, 20:7778 (R;PK)

Pakistan Inst. of Nuclear Science and Technology, Islamabad (Pakistan). Nuclear Engineering Div.
Delayed neutron monitoring system for fuel failure detection at PARR-1, 20:7775 (R;PK)
Development of a new control software package for Pakistan Research Reactor-2, 20:7751 (R;PK)
Development of PC-based FFT system for reactor dynamic analysis, 20:7644 (R;PK)
Environmental impact of Pakistan Research Reactor-2 following a hypothetical radiological release accident, 20:7759 (R;PK)

Neutronic analysis for upgradation of Pakistan Research Reactor-1 from 9 to 10 MW, 20:7776 (R;PK)
Radiological consequence analysis for upgradation of Pakistan Research Reactor-1 from 9 to 10 MW, 20:7758 (R;PK)
Thermal hydraulic analysis for upgradation of Pakistan Research Reactor-1 from 9 to 10 MW, 20:7777 (R;PK)

Pakistan Inst. of Nuclear Science and Technology, Islamabad (Pakistan). Nuclear Physics Div.
Contributions of research Reactors in science and technology, 20:7779 (R;PK)

Pakistan Inst. of Nuclear Science and Technology, Islamabad (Pakistan). Radiation and Isotope Application Div.
Coliform bacteria as in indicator of sewerage water mixing with drinking water sources in Rawalpindi city, 20:8545 (R;PK)
Isotopic and chemical characterization of coal in Pakistan, 20:7161 (R;PK)
Review of neutron radiographic applications in industrial and biological systems, 20:7534 (R;PK)
Standardization of $^{13}CO_2$ production procedure from organic matter for mass spectrometric analysis, 20:8174 (R;PK)

Paul Scherrer Inst. (PSI), Villigen (Switzerland)
"Abrupt change" scenarios. Global scenarios revisited with respect to emerging scientific insights, 20:7891 (RA;CH)
Betting on climate states. The impact of climate change prospects on decision making under "strong" uncertainty and collective risks, 20:7900 (RA;CH)
Climate change and discount rates, 20:7893 (RA;CH)
Colloid properties in groundwaters from crystalline formations, 20:8513 (R;CH)
Decision making framework to address climate change, 20:7897 (RA;CH)
Decision-making under environmental uncertainty, 20:7895 (RA;CH)
Energy and sustainability: a global view, 20:7835 (IA;CH)
Energy conversion research at the PSI: combustion, fuels from biomass, solar energy, 20:7914 (IA;CH)
Energy research - as seen by industry, 20:7841 (IA;CH)
Energy research in the European Union, 20:7840 (IA;CH)
Environmental problems and attitudes towards risk and uncertainty, 20:7896 (RA;CH)
Evaluation of the SMOLENSK-3 NPP shutdown system. Phase I: code implementation and testing. First progress report, 20:7667 (R;CH)
Global environmental risks and financial instruments, 20:7898 (RA;CH)
Global warming damage and the risk of a climate catastrophe, 20:7892 (RA;CH)
Insurable risk associated to climate change, 20:7865 (RA;CH)
Internalisation of external costs in Switzerland and Europe, 20:7843 (IA;CH)
Methods for the integral assessment of energy-related problems, 20:7844 (IA;CH)
Nuclear power plant safety in the framework of future energy systems, 20:7782 (IA;CH)
On the opportunity cost of climate change and policy, 20:7894 (RA;CH)
Politics and public policy: critical factors for sustainability in the energy sector, 20:7836 (IA;CH)
Portfolio analysis model of climate change decision making, 20:7899 (RA;CH)
Programme and book of abstracts, 20:7834 (I;CH;In English, German, French)
Recent findings with respect to climate development, 20:7850 (IA;CH)
Steps towards a decision making framework to address climate change, 20:7890 (R;CH)
Sustainability as seen by the entrepreneur, 20:7837 (IA;CH)
Sustainability: ecology comes of age, 20:7838 (IA;CH)
The energy storage program of PSI, 20:7825 (IA;CH)
Theory and practice of internalisation of external costs, 20:7842 (IA;CH;In German)
Trends in safety assessment of radioactive waste repositories, 20:7295 (IA;CH)
World energy scenarios: the two-kilowatt-society, a plausible future or an illusion, 20:7839 (IA;CH)

Peer Consultants, Inc., Oak Ridge, TN (United States)
Selection of liquid-level monitoring method for the Oak Ridge National Laboratory inactive liquid low-level waste tanks, remedial investigation/feasibility study, 20:7333 (R;US)

Pennsylvania State Univ., University Park, PA (United States)
An experimental and theoretical study to relate uncommon rock/fluid properties to oil recovery. Quarterly report, July 1, 1993–September 30, 1993, 20:7189 (R;US)
An experimental and theoretical study to relate uncommon rock/fluid properties to oil recovery. Quarterly report, October 1, 1993–December 31, 1993, 20:7190 (R;US)
Development of a cost effective environment compliance technology for stripper brine wells. Quarterly report, July 1, 1994–September 30, 1994, 20:7239 (R;US)

Pennsylvania State Univ., University Park, PA (United States). Coal and Organic Petrology Labs.
Surface properties of photo-oxidized bituminous coals. Technical progress report, July–September, 1994, 20:7148 (R;US)

Pennsylvania State Univ., University Park, PA (United States). Coll. of Earth and Mineral Sciences
Advanced thermally stable jet fuels. Technical progress report, January 1994–March 1994, 20:7247 (R;US)

Pennsylvania State Univ., University Park, PA (United States). Dept. of Materials Science and Engineering
Semiconductor electrochemistry of coal pyrite. Technical progress report, July–September, 1994, 20:7145 (R;US)

Physical Sciences, Inc., Andover, MA (United States)
Fundamental study of ash formation and deposition: Effect of reducing stoichiometry. Quarterly report No. 6, 1 July–30 September 1994, 20:7175 (R;US)

Pittsburgh Univ., PA (United States). Dept. of Chemical and Petroleum Engineering
Effect of pretreating of host oil on coprocessing. Quarterly progress report, July 1–September 30, 1994, 20:7128 (R;US)

Poitiers Univ., 86 (France)
Hydrodenitrogenation mechanism of aromatic amines. Kinetic study and simulation, 20:7902 (R;FR;In French)

Prairie View A and M Univ., TX (United States)
A report: A plan to establish Internet access points at Minority Campus sites for connection to a central computing facility, 20:9163 (R;US)

Praxair, Inc., Tarrytown, NY (United States)
Oxygen enriched combustion system performance study. Phase 2: 100 percent oxygen enriched combustion in regenerative glass melters, Final report, 20:8023 (R;US)

Princeton Univ., NJ (United States). Plasma Physics Lab.
A linear systems description of the CO_2 laser based tangential imaging system, 20:9078 (R;US)
Active core profile and transport modification by application of Ion Bernstein Wave power in PBX-M, 20:9076 (R;US)
Advanced Light Source: Activity report 1993, 20:8335 (R;US)
Alpha particle loss in the TFTR DT experiments, 20:9088 (R;US)
Collaborations in fusion research, 20:9125 (R;US)
Design studies for ITER x-ray diagnostics, 20:9082 (R;US)
Energetic/alpha particle effects on MHD modes and transport, 20:9081 (R;US)
Exploration of low-aspect-ratio tokamak regimes in the CDX-U and TS-3 devices, 20:9089 (R;US)
Field-aligned coordinates for nonlinear simulations of tokamak turbulence, 20:9085 (R;US)
Flow shear induced fluctuation suppression in finite aspect ratio shaped tokamak plasma, 20:9087 (R;US)
Formation of core transport barrier and CH-Mode by ion Bernstein wave heating in PBX-M, 20:9086 (R;US)
Hot-ion Bernstein wave with large $k_{parallel}$, 20:9080 (R;US)
Important plasma problems in astrophysics, 20:8706 (R;US)
Initial H-mode experiments in DT plasmas on TFTR, 20:9079 (R;US)
Progress in compact soft x-ray lasers and their applications, 20:8275 (R;US)
Role of MHD activity in LH-assisted discharges in the PBX-M tokamak, 20:9083 (R;US)
Transport in gyrokinetic tokamaks, 20:9077 (R;US)

X-ray laser studies using plasmas created by optical field ionization, 20:9084 (R;US)

Purdue Univ., Lafayette, IN (United States)
Midwest Superconductivity Consortium: 1994 Progress report, 20:8120 (R;US)

R

Radian Corp., Austin, TX (United States)
Field study of circulating fluidized-bed ash. Final report, April 1986–October 1994, 20:7151 (R;US)
High SO_2 removal efficiency testing. Quarterly status report, April–June, 1994, 20:7634 (R;US)

Radiological Protection Inst. of Ireland (Ireland)
Radon in dwellings in selected areas of Ireland, 20:8465 (R;IE)

Rennes-1 Univ., 35 (France)
Interactive three dimensional simulation for generation of synthetical returns in remote handling assisted by computer, 20:8228 (R;FR;In French)

Rensselaer Polytechnic Inst., Troy, NY (United States)
Enhanced boiling heat transfer in horizontal test bundles, 20:8022 (R;US)

Reservoir Engineering Research Inst., Palo Alto, CA (United States)
Research program on fractured petroleum reservoirs. Quarterly progress report, July 1–September 30, 1994, 20:7206 (R;US)

Resource Development Associates, Marietta, GA (United States)
Methane recovery from animal manures: A current opportunities casebook, 20:7552 (R;US)

Resource Technology Corp., Laramie, WY (United States)
Evaluation of the freeze-thaw/evaporation process for the treatment of produced waters. Quarterly technical progress report, July 1, 1994–September 30, 1994, 20:7240 (R;US)

Rijksuniversiteit Groningen (Netherlands)
A review of electron scattering at intermediate energies, 20:8913 (IA;IR;In English, Persian)

Risoe National Lab., Roskilde (Denmark)
Three-year plan (1995-1997) for the activities of Risoe National Laboratory, 20:7879 (R;DK;In Danish)

Risoe National Lab., Roskilde (Denmark). Combustion Dept.
Interview and literature study of combustion and deposition characteristics of straw, 20:7558 (R;DK;In Danish)

Risoe National Lab., Roskilde (Denmark). Materials Dept.
Thermoelectric power of solid oxide fuel cell materials, 20:7946 (R;DK)

Risoe National Lab., Roskilde (Denmark). Solid State Physics Dept.
X-ray and neutron scattering from amorphous diamondlike carbon and hydrocarbon films, 20:8989 (R;DK)

Risoe National Lab., Roskilde (Denmark). Systems Analysis
Wind energy market study Eastern Europe. Czech and Slovak Republics, 20:7609 (R;DK)
Wind energy market study Eastern Europe. Poland, 20:7610 (R;DK)

Risoe National Lab., Roskilde (Denmark). Test Station for Wind Turbines
Verification of design basis 2 - a coupled aeroelastic wind turbine model, 20:7624 (R;DK)
Wind turbine test Nordtank NTK 500/37. System test, 20:7623 (R;DK)

Rochester Univ., NY (United States). Dept. of Mechanical Engineering
Microstructural behavior of nonequilibrium systems. Final report, March 1, 1986–May 31, 1993, 20:8069 (R;US)

Roedder (Peter) Ingenieurberatung, Aachen (Germany)
Radiological effects of an aircraft crash into the BER II research reactor. Comparison of effects for HEU and LEU fuels, 20:7785 (R;DE;In German)

Rostock Univ. (Germany)
Instantaneous Chiral Quark Model for Relativistic Mesons in a Hot and Dense Medium, 20:8835 (R;XJ)

Royal Inst. of Tech., Stockholm (Sweden). Dept. of Fusion Plasma Physics
SALOME. Software for the analysis of lines or multiplets from Extrap. User's guide, 20:9175 (R;SE)
Vertical displacement and position control in tokamaks, 20:9069 (R;SE)

Ruhrgas AG, Essen (Germany)
The outlook for natural gas in Germany, 20:7250 (R;NO)

Ruhrkohle AG, Essen (Germany)
Joint-project transport control system. Sub-project: Set-up of a material flow control with integration into the district control center's infrastructure. Final report, 20:7162 (R;DE)

Ruhrkohle AG, Herne (Germany)
Development and testing of new methods for prevention and suppression of spontaneous combustion fires in coal mining. Final report, 20:7164 (R;DE)

Ruhrkohle Bergbau AG, Herne (Germany)
Automation in mining - sensor for position monitoring. Mining requirements, machine integration, testing. Final report, 20:7163 (R;DE;In German)

S

San Diego State Univ., CA (United States)
The development of a generic model for assessing the effects of elevated CO_2 on ecosystems. Progress report, September 1, 1987–May 31, 1988, 20:8569 (R;US)
[Generic ecosystem model for assessing the effects of elevated carbon dioxide on ecosystems]. [Annual] report, July 1, 1988–June 30, 1989, 20:8570 (R;US)

Sandia National Labs., Albuquerque, NM (United States)
A domain decomposition study of massively parallel computing in compressible gas dynamics, 20:8255 (R;US)
A statistical analysis of the effect of PECVD deposition parameters on surface and bulk recombination in silicon solar cells, 20:7588 (R;US)
An overview of technology, equipment and applications, 20:7511 (R;US)
Back surface cell structures for reducing recombination in CZ silicon solar cells, 20:7594 (R;US)
CALSON Process, 20:9195 (R;US)
Core damage frequency observations and insights of LWRs based on the IPEs, 20:7649 (R;US)
Crushable structure performance determined from reconstructed dynamic forces during impact tests, 20:8424 (R;US)
Crystalline-silicon photovoltaics: Necessary and sufficient, 20:7589 (R;US)
Disilene Addition to C_{70}, 20:8193 (R;US)
Ecological risk assessment benefits environmental management, 20:7866 (R;US)
Effect of He pressure on the superconducting transition temperatures of Na_2CsC_{60} and $(NH_3)_4Na_2CsC_{60}$, 20:8147 (R;US)
Evidence for modified transport due to sheared E x B flows in high-temperature plasmas, 20:9049 (R;US)
Evolution of patterns of regional groundwater flow in southeastern New Mexico: Response to post-Pleistocene changes in climate, 20:7294 (R;US)
Extraction of the surface recombination velocity of passivated phosphorus-doped silicon emitters, 20:7590 (R;US)
Failure analysis: Status and future trends, 20:8222 (R;US)
Feasibility of ceramic joining with high energy electron beams, 20:8130 (R;US)
Full report: Assessment and opportunity identification of energy efficient pollution prevention technologies and processes, 20:8040 (R;US)
GaAsSb-based heterojunction tunnel diodes for tandem solar cell interconnects, 20:7593 (R;US)
High surface area, high permeability carbon monoliths, 20:8146 (R;US)
High-performance GaAs/AlGaAs optical modulators: Their performance and packaging for microwave photonic integrated circuits, 20:8277 (R;US)

Human event observations in the individual plant examinations, 20:7823 (R;US)
Implementation of a parallel algorithm for thermo-chemical nonequilibrium flow simulations, 20:8256 (R;US)
In situ electrokinetic control of moisture and nutrients in unsaturated soils, 20:7488 (R;US)
Laser beam characterization results for a high power CW Nd:YAG laser, 20:8276 (R;US)
Leadership – It's everybody's business, 20:9150 (R;US)
Mass transport through polycrystalline microstructures, 20:8107 (R;US)
Micro heat spreader enhanced heat transfer in MCMs, 20:8279 (R;US)
Microporous polyimide films for reduced dielectric applications, 20:8148 (R;US)
New novel cleaning technique for extending mean time between mechanical cleans in a Genus tungsten CVD reactor, 20:8106 (R;US)
Non-destructive characterization of porous silicon using X-ray reflectivity, 20:8145 (R;US)
Non-Salado flow and transport position paper. Revision 1, 20:7293 (R;US)
Optical properties of fractal nanocomposites, 20:8980 (R;US)
Particle transport in plasma reactors, 20:8149 (R;US)
Physical and Chemical Sciences Center: Research briefs. Volume 9-94, 20:7880 (R;US)
Progress in ion beam power coupling and ion-driven hohlraums on PBFA II, 20:9126 (R;US)
Prosperity Game: Advanced Manufacturing Day, May 17, 1994, 20:7847 (R;US)
Rapid thermal processing of high-efficiency silicon solar cells with controlled in-situ annealing, 20:7595 (R;US)
Recent advances in lithium ion technology, 20:7833 (R;US)
Recent progress in the Photovoltaic Manufacturing Technology Project (PVMaT), 20:7596 (R;US)
Recipes for high resolution time-of-flight detectors, 20:8176 (R;US)
Reduction in fiber damage thresholds due to static fatigue, 20:8131 (R;US)
Reflectance control for multicrystalline-silicon photovoltaic modules using textured-dielectric coatings, 20:7591 (R;US)
Risk contribution from low power, shutdown, and other operational modes beyond full power, 20:7650 (R;US)
Silicon heat pipes for cooling electronics, 20:8257 (R;US)
Silicon surface and bulk defect passivation by low temperature PECVD oxides and nitrides, 20:7587 (R;US)
Summary report: Assessment and opportunity identification of energy efficient pollution prevention technologies and processes, 20:8039 (R;US)
Supai salt karst features: Holbrook Basin, Arizona, 20:7246 (R;US)
Synthesis and characterization of FE colloid catalysts in inverse micelle solutions, 20:8194 (R;US)
The effect of encapsulation on the reflectance of photovoltaic modules using textured multicrystalline-silicon solar cells, 20:7592 (R;US)
The effect of O_2 intercalation on the rotational dynamics and the ordering transition of C_{60}, 20:8175 (R;US)
Transient radiation-induced absorption in materials for the DOI laser, 20:8278 (R;US)
Uncertainty and sensitivity analysis of food pathway results with the MACCS Reactor Accident Consequence Model, 20:8509 (R;US)
Understanding and improving materials processing through interpreting and manipulating predictive models, 20:8108 (R;US)
Verification of computational aerodynamic predictions for complex hypersonic vehicles using the INCA™ code, 20:8258 (R;US)
Violent reaction source term study, 20:8425 (R;US)
Visible light emitting vertical cavity surface emitting lasers, 20:8272 (PA;US)

Sandia National Labs., Livermore, CA (United States)
Baseline NO_x emissions during combustion of wood-derived pyrolysis oils, 20:7560 (R;US)
Correlations for the NO $A^2\Sigma^+$ electronic quenching cross-section, 20:8963 (R;US)
Pollution prevention opportunity assessment for Building 922 solid office waste, 20:7356 (R;US)
Pollution prevention opportunity assessment for the SNL/California waste management facilities, 20:7357 (R;US)
The evaluation of potential limonene scavengers, 20:8466 (R;US)

Science Applications International Corp., Richland, WA (United States)
K Basin spent fuel sludge treatment alternatives study. Volume 1, Regulatory options, 20:7343 (R;US)
K Basin spent fuel sludge treatment alternatives study. Volume 2, Technical options, 20:7344 (R;US)

SciTech, Inc., Aurora, IL (United States)
SciTech Clubs for Girls. [Final report], September 1, 1991–April 30, 1994, 20:8654 (R;US)

Secretary of Energy Advisory Board, Washington, DC (United States)
Alternative futures for the Department of Energy National Laboratories, 20:7881 (R;US)

Senter for Oekonomisk Analyse (ECON), Oslo (Norway)
Cost-effective environmental policy to environmental problems from the transportation sector in cities, 20:7857 (R;NO;In Norwegian)
Joint implementation of climatic measures, 20:7858 (R;NO;In Norwegian)

Shahid Bahonar Univ., Kerman (Iran, Islamic Republic of). Dept. of Physics
Quarks search in cosmic rays, 20:8793 (IA;IR;In English, Persian)

Sharif Univ. of Technology, Teheran (Iran, Islamic Republic of). Dept. of Physics
On the inhomogeneous quantum groups, 20:8726 (IA;IR;In English, Persian)
Quantum chains with G L q(2) symmetry, 20:8727 (IA;IR;In English, Persian)
The discovery of t quark, 20:8833 (IA;IR;In English, Persian)

Shiraz Univ. (Iran, Islamic Republic of)
A new concept to increase muon cycle rate in muon catalyzed fusion, 20:9050 (IA;IR;In English, Persian)
Geometrical and non-geometrical constants of de sitter spacetime, 20:8728 (IA;IR;In English, Persian)

Shiraz Univ. (Iran, Islamic Republic of). Dept. of Physics
B to D and D to K semileptonic weak decay form factors, 20:8795 (IA;IR;In English, Persian)
The boiling water reactor transfer function studies by non-linear dynamical equations, 20:7646 (IA;IR;In English, Persian)

Sierra Research, Inc., Sacramento, CA (United States)
Reformulated gasoline study, executive summary, 20:7242 (R;US)

Slovakia Energy, Ballerup (Denmark)
Estimate of resources from wastes in Denmark, 20:7868 (R;DK;In Danish)

South Dakota State Univ., Brookings, SD (United States)
Develop a field grid system for yield mapping and machine control. Quarterly report, October 1–December 31, 1994, 20:8598 (R;US)

South Dakota State Univ., Brookings, SD (United States). Dept. of Chemistry
Report to the Department of Energy on the DOE/EPSCoR planning activities for the state of South Dakota, 20:8221 (R;US)

Southeastern Universities Research Association, Inc., Newport News, VA (United States). Continuous Electron Beam Accelerator Facility
Depolarization in the SLC Collider Arcs, 20:8306 (R;US)
Superharp: A wire scanner with absolute position readout for beam energy measurement at CEBAF, 20:8313 (R;US)

Southern Illinois Univ., Carbondale, IL (United States). Dept. of Mining Engineering
Management of dry flue gas desulfurization by-products in underground mines. Annual report, October 1993–September 1994, 20:7153 (R;US)

Southern Research Inst., Birmingham, AL (United States)
Fundamental mechanisms in flue gas conditioning. Quarterly report, July 1994–September 1994, 20:7156 (R;US)

Southwest Research Inst., San Antonio, TX (United States)
Development of a dedicated ethanol ultra-low emission vehicle (ULEV) system design, 20:8064 (R;US)

Spauschus Associates, Inc., Stockbridge, GA (United States)
Sealed tube comparisons of the compatibility of desiccants with refrigerants and lubricants. Quarterly technical progress report, July 1994–September 1994, 20:7962 (R;US)

Spectra Technology, Inc., Bellevue, WA (United States)
Inverse Cerenkov laser accelerator experiment annual report. 1990 Annual report, 20:8286 (R;US)
Inverse Cerenkov LPA experiments. 1986 Annual report, 20:8285 (R;US)

Spokane Indian Tribe, Wellpinit, WA (United States)
Blue Creek Winter Range: Wildlife Mitigation Project. Final environmental assessment, 20:7579 (R;US)

SRI International, Menlo Park, CA (United States)
Advanced separation technology for flue gas cleanup. Quarterly technical report No. 10, 20:7635 (R;US)
Highly dispersed catalysts for coal liquefaction. Quarterly report No. 12, May 23, 1994–August 22, 1994, 20:7124 (R;US)

Stanford Linear Accelerator Center, Menlo Park, CA (United States)
A measurement of quark and gluon jet differences at the Z^0 resonance, 20:8807 (R;US)
A measurement of the left-right, forward-backward asymmetry for charm quarks using D^{*+} and D^+ mesons, 20:8816 (R;US)
A photoemission study of the diamond and the single crystal C_{60}, 20:8150 (R;US)
A search for jet handedness in hadronic Z^0 decays, 20:8805 (R;US)
A search for jet handedness in hadronic Z^0 decays, 20:8813 (R;US)
A test of the flavor independence of strong interactions, 20:8808 (R;US)
A test of the flavor independence of strong interactions, 20:8817 (R;US)
Adventures in the evolution of a high-bandwidth network for central servers, 20:9187 (R;US)
BABAR - the detector for the PEP II B Factory at SLAC, 20:8399 (R;US)
Creation of a scalar potential in 2D dilaton gravity, 20:8737 (R;US)
Decoherence, determinism and chaos revisited, 20:8682 (R;US)
Depolarization in the SLC Collider Arcs, 20:8306 (R;US)
Extending the kinematic range for W_R searches in e^-e^- collisions at the NLC, 20:8806 (R;US)
Future accelerators and experiments, 20:8296 (R;US)
High gradient tests of SLAC Linear Collider Accelerator Structures, 20:8328 (R;US)
Linear collider research and development, 20:8297 (R;US)
Measurement of α_s from hadronic event observables at the Z^0 resonance, 20:8809 (R;US)
Measurement of the charged multiplicity of $Z^0 \rightarrow b\bar{b}$ events, 20:8811 (R;US)
Multiplicity moments in e^+e^- annihilation into hadrons at the Z^0 resonance, 20:8810 (R;US)
Over-compression, a method to shape the longitudinal bunch distribution for a reduced energy spread, 20:8307 (R;US)
PEP-II vacuum system - joining SS flanges to copper beam chambers, 20:8327 (R;US)
Polarization at SLAC, 20:8329 (R;US)
Precision electroweak physics with the SLD/SLC: The left-right polarization asymmetry, 20:8770 (R;US)
Probing new physics in rare charm processes, 20:8818 (R;US)
Production of polarized τ pairs and tests of CP violation using polarized $e^\pm$ colliders near threshold, 20:8738 (R;US)
Quantum corrections for a cosmological string solution, 20:8735 (R;US)
Radiation and radiation reaction in continuous focusing channels, 20:8326 (R;US)
Recent progress in one-loop multi-parton calculations, 20:8769 (R;US)
Review of the SLAC and Les Houches workshops, 20:8330 (R;US)
Squark mass determination at a future linear collider, 20:8838 (R;US)
Status and future prospects for United States accelerators and accelerator physics, 20:8281 (R;US)
Tau physics at future facilities, 20:8840 (R;US)
Test of a conceptual prototype of the total internal reflection Cherenkov imaging detector (DIRC) with cosmic muons, 20:8401 (R;US)
Test of an array of CsI(Tl) crystal towers for a low or medium energy e^+e^- collider calorimeter, 20:8400 (R;US)
The discovery of the tau lepton: Part 1, The early history through 1975; Part 2, Confirmation of the discovery and measurement of major properties, 1976–1982, 20:8839 (R;US)
The left-right forward-backward asymmetry of heavy quarks measured with jet charge and with leptons at the SLD, 20:8815 (R;US)
Tutorial on beam-based feedback systems for linacs, 20:8308 (R;US)

Stanford Univ., CA (United States)
A search for jet handedness in hadronic Z^0 decays, 20:8814 (R;US)
EGS4 in '94: A decade of enhancements, 20:8950 (R;US)
Electroweak coupling measurements from polarized Bhabha scattering at the Z^0 resonance, 20:8812 (R;US)
Measurement of α_s from hadronic event observables at the Z^0 resonance, 20:8804 (R;US)
Testing supersymmetry at the next linear collider, 20:8736 (R;US)

Stanford Univ., CA (United States). Dept. of Geological and Environmental Sciences
Models of natural fracture connectivity – Implications for reservoir permeability. Final report, 20:8649 (R;US)

Stanford Univ., CA (United States). Dept. of Petroleum Engineering
Productivity and injectivity of horizontal wells. Quarterly report, July 1, 1994–September 30, 1994, 20:7205 (R;US)

Stanford Univ., CA (United States). High Temperature Gasdynamics Lab.
Char particle fragmentation and its effect on unburned carbon during pulverized coal combustion. Quarterly report, April 1–June 30, 1994, 20:7176 (R;US)

State Univ. of New York, Albany, NY (United States). Atmospheric Sciences Research Center
Use of cloud observations and mesoscale meteorology models to evaluate and improve cloud parameterizations. Technical progress report, 1 October 1993–30 December 1994, 20:8433 (R;US)

State Univ. of New York, Binghamton, NY (United States). Dept. of Physics
CP violation tests for tau/top processes, 20:8714 (R;US)
CP violation tests for top/tau processes, 20:8716 (R;US)
q-bosons and the q-analogue quantized field, 20:8715 (R;US)
Tau as a probe for new physics, 20:8783 (R;US)
Tests for leptonic CP violation in tau decays, 20:8717 (R;US)

State Univ. of New York, Stony Brook, NY (United States)
Prospects for pyrolysis technologies in managing municipal, industrial, and DOE cleanup wastes, 20:7542 (R;US)

State Univ. of New York, Stony Brook, NY (United States). Research Foundation
Design of supramolecular ordered systems for mesoscopic colloids and molecular composites. Progress report, November 10, 1993–June 10, 1994, 20:8138 (R;US)

Statens Byggeforskningsinstitut, Hoersholm (Denmark). Afd. for Energi og Indeklima
Daylighting in business buildings. State report, 20:7985 (R;DK;In Danish)

Statens Jordbrugstekniske Forsoeg, Horsens (Denmark)
Energy consumption in the primary agricultural activities. Branch analysis, 20:8029 (R;DK;In Danish)
Energy consumption in the primary agricultural activities. Branch analysis, 20:8030 (R;DK;In Danish)

Statistik der Kohlenwirtschaft e.V., Essen (Germany)
Coal mining situation in the Federal Republic of Germany. First half-year 1994, 20:7165 (I;DE;In German)

Statni Urad pro Jadernou Bezpecnost, Prague (Czech Republic)
Safety assessment principles for nuclear plants, 20:7643 (I;CZ;In Czech)
Selected legal documents in the field of peaceful uses of nuclear energy in the Czech Republic, 20:7882 (I;CZ;In Czech)

STI Optronics, Bellevue, WA (United States)
100 MeV laser accelerator demonstration and 1 GeV baseline design development. 1992 Annual report, 20:8287 (R;US)

Stiftelsen foer Vaermeteknisk Forskning, Stockholm (Sweden)
Corrosion testing of three highly alloyed stainless steels in hot chlorinated seawater, 20:8110 (R;SE;In Swedish)
De-aeration of feedwater by membrane-technique, 20:8177 (R;SE;In Swedish)

Evaluation of the prerequisites to adapt to the law on environmental charges on emission of nitrogen oxides in energy production at combustion plants producing 25-50 GWh/year, 20:7867 (R;SE;In Swedish)
Stack gas flow measurement based on fan characteristics, 20:8468 (R;SE;In Swedish)

Stockholm Environment Inst. (Sweden)
African voices on climate change. Policy concerns and potentials, 20:7862 (R;SE)
Household energy and nutrition. A study of low-income households in Lusaka, 20:8009 (R;SE)

Studsvik Eco and Safety AB, Nykoeping (Sweden)
Density-driven displacement of pore water as possible factor affecting the vertical distribution of Chernobyl-derived radionuclides in a Baltic Sea sediment, 20:8547 (R;SE)

Studsvik Material AB, Nykoeping (Sweden)
Chemistry in water reactors, 20:8219 (R;SE;In Swedish)
EVOPE - Evaluation of polyethylene pipes for gas distribution. Final report, 20:7256 (R;SE;In Swedish)
Relining of pipelines for natural gas distribution (Swage-lining), 20:8265 (R;SE;In Swedish)

Stuttgart Univ. (Germany). Inst. fuer Kernenergetik und Energiesysteme
Theoretical and experimental investigation of a high-temperature latent heat storage system with a salt ceramic composite as storage medium, 20:7604 (R;DE;In German)

Stuttgart Univ. (Germany). Staatliche Materialpruefungsanstalt
Drill core investigations from the TMI-2 pressure vessel. Final report, 20:7787 (R;DE;In German, English)

Superconducting Super Collider Lab., Dallas, TX (United States)
The development of a positron ionization gauge, 20:8415 (R;US)

Surtek, Inc., Golden, CO (United States)
Detailed evaluation of the West Kiehl alkaline-surfactant-polymer field project and it's application to mature Minnelusa waterfloods. Technical progress report, July–September, 1994, 20:7203 (R;US)

Svenska Renhaallningsverksfoereningen, Malmoe (Sweden)
Optimization of biogas recovery by controlled deposition of solid waste. Status report 4, 20:7562 (R;SE;In Swedish)

Swedish Environmental Protection Agency, Solna (Sweden)
Eutrophication of soil, fresh water and the sea, 20:8516 (R;SE)

Swedish Environmental Research Inst., Goeteborg (Sweden)
Emission measurements from a urea-based SCR/oxi catalytic NO_x/HC exhaust gas treatment system on board a diesel powered passenger ferry - operation after 12000 hours service, 20:8455 (R;SE)

Swedish Environmental Research Inst., Stockholm (Sweden)
Phthalates in Swedish sediments, 20:8541 (R;SE)

Swedish National Board for Industrial and Technical Development (NUTEK), Stockholm (Sweden)
About the influence on the heat load from net structure and operating strategy for a DH-network, 20:8054 (RA;SE)
District heating. Research summary 1988-1993, 20:8053 (RA;SE)
Energy dense water, 20:8050 (R;SE)
Evaluation of instruments and incentives for limitation of carbon dioxide emissions in Sweden, 20:7903 (R;SE;In Swedish)
Increased energy capacity in district heating fluids, 20:8051 (RA;SE)
Market conditions for wind power and biofuel-based cogeneration, 20:7561 (R;SE;In Swedish)
Specific heat capacity and melting/crystallisation characteristics of polytridecanolactone, 20:8052 (RA;SE)

Swedish National Testing and Research Inst., Boraas (Sweden)
Crack closure - an experimental study, 20:8109 (R;SE;In Swedish)

Swedish Nuclear Fuel and Waste Management Co., Stockholm (Sweden)
Aespoe Hard Rock Laboratory. Annual Report 1993, 20:7360 (R;SE)
Decommissioning of Swedish nuclear power reactors. Technology and costs, 20:7647 (R;SE;In Swedish)
Final report of the AECL/SKB Cigar Lake analog study, 20:7358 (R;SE)
Performance of the SKB copper/steel canister, 20:7361 (R;SE)
Project Caesium - An ion exchange model for the prediction of distribution coefficients of caesium in bentonite, 20:8195 (R;SE)
Radioactive waste processing and disposal. A complement to the program 1992, 20:7332 (R;SE;In Swedish)
Tectonic framework of the Hanoe Bay area, southern Baltic Sea, 20:8514 (R;SE)
The structure of conceptual models with application to the Aespoe HRL project, 20:7359 (R;SE)

Swedish Radiation Protection Inst., Stockholm (Sweden)
Radioactive waste in the Russian Federation, 20:7362 (R;SE)

Swedish Transport and Communications Research Board, Stockholm (Sweden)
Emission and energy evaluation principles for transport systems, 20:8014 (R;SE;In Swedish)
Scenarios for introduction of bio-ethanol, 20:8065 (R;SE;In Swedish)

Swedish Univ. of Agricultural Sciences, Umeaa (Sweden). Dept. of Animal Ecology
Chernobyl cesium in the Swedish moose population: Effect of age, diet and habitat selection, 20:8508 (R;SE)

Swedish Univ. of Agricultural Sciences, Uppsala (Sweden). Dept. of Ecology and Environmental Research
Frost resistance in Salix, 20:7538 (R;SE)
Modelling the impacts of sulphur and nitrogen deposition on forests, 20:8515 (R;SE)

Swedish Univ. of Agricultural Sciences, Uppsala (Sweden). Dept. of Radioecology
Estimated effects of radioactive fallout on agricultural production in Sweden. Contamination of crop products, 20:8634 (R;SE;In Swedish)
Estimated effects of radioactive fallout on agricultural production in Sweden. Contamination of animal products, 20:8635 (R;SE;In Swedish)
Interview-survey of farmers. Experiences after the Chernobyl accident, 20:7884 (R;SE;In Swedish)

Swedish University of Agricultural Sciences, Department of Agricultural Biosystems and Technology, Lund (Sweden)
Performance of additives in reducing ammonia emissions from cow slurry, 20:8467 (R;SE)

Syracuse Univ., NY (United States). Dept. of Chemical Engineering and Materials Science
Hydrogen storage on activated carbon. Final report, 20:7536 (R;US)

T

TAMCO Power Partners, Williamsport, PA (United States)
Toms Creek Integrated Gasification Combined Cycle Demonstration Project. Quarterly progress report, July 1, 1994–September 30, 1994, 20:7106 (R;US)

Tampa Electric Co., FL (United States)
Tampa Electric Company Polk Power Station Unit Number 1. Annual report, January–December, 1993, 20:7629 (R;US)

Tampere Univ. of Technology (Finland). Lab. of Electricity and Magnetism
Availability analysis of a 100 kWh superconducting magnetic energy storage, 20:7827 (R;FI)

Tampere Univ. of Technology (Finland). Thermal Engineering
Combustion experiments of fuel gases in atmospheric fluidized bed combustor test rig, 20:7186 (R;FI)
Heat transfer and hydrodynamics of falling liquid films, 20:8260 (R;FI)
Particle-turbulence interaction in dilute suspensions, 20:8259 (R;FI)

Technical Research Centre of Finland, Espoo (Finland)
Usability of catalytic gas cleaning in a simplified IGCC power system. Deactivation of Ni/Al_2O_3 catalysts. Literature review, 20:7640 (R;FI)

Technical Research Centre of Finland, Espoo (Finland). Aerosol Technology Group
Report series in aerosol science, 20:8437 (R;FI)

Technische Hochschule Aachen (Germany)
Radiation exposure due to gamma-ray submersion, 20:7753 (R;DE;In German)
The chemical behaviour of iodine-129 in the process of radwaste conditioning, 20:7319 (R;DE;In German)

Technische Univ. Berlin (Germany). Inst. fuer Schiffs- und Meerestechnik
Improvements in heavy oil fuel systems for marine diesel engines, 20:8057 (R;DE;In German)

Technische Univ. Clausthal, Clausthal-Zellerfeld (Germany). Inst. fuer Tiefbohrtechnik, Erdoel- und Erdgasgewinnung
The pre-calculation of ground subsidence due to extraction above petroleum and natural gas deposits, 20:7241 (R;DE;In German)

Technische Univ. Hamburg-Harburg, Hamburg (Germany)
Local quantitative phase analysis of two-phase TiAl(Cr)-alloys by analytical transmission electron microscopy, 20:8080 (R;DE;In German)
Simulation and stability testing of the fuzzy control of an implant welding unit, 20:8079 (R;DE;In German)

Technische Univ., Vienna (Austria). 1. Inst. fuer Theoretische Physik
Toponium energy levels, 20:8834 (IA;IR;In English, Persian)

Telluride Academy, CO (United States)
A method to recognize distant repeats in protein sequences, 20:8557 (RA;US)
A new method to configure protein side-chains in homology modelling, 20:8555 (RA;US)
Biopolymer sequences and structures, 20:8565 (RA;US)
Computational molecular biology in logical perspective, 20:8559 (RA;US)
Coordinated changes in protein multiple sequence alignments, 20:8556 (RA;US)
Deriving non-homogeneous Markov chain models from the multiple alignment with the entropy criteria, 20:8574 (RA;US)
Determination of architectural elements of RNA structure, 20:8558 (RA;US)
Estimation of protein coding density in a corpus of DNA sequence data, 20:8575 (RA;US)
Evolution on fitness landscapes, 20:8566 (RA;US)
Evolution on rugged landscapes, 20:8561 (RA;US)
Just-in-time information forwarding: Biological systems viewed as Shannonian Communication Systems, 20:8562 (RA;US)
Nonalignability and noncompactness models and reality of low-complexity protein segments, 20:8567 (RA;US)
On the Schroedinger question, 20:8564 (RA;US)
Physical mapping in the presence of errors: The chimeric clones problem, 20:8576 (RA;US)
Prediction of protein folding pathways, 20:8554 (RA;US)
Science is in the eye of the beholder, 20:8551 (RA;US)
Surface contraction and expansion waves correlated with differentiation in axolotl embryos. III. The shape of the fate map, 20:8571 (RA;US)
The limits to reason what science can know about everyday events, 20:8550 (RA;US)
Toward the unification of sequence and structural data for identification of structural and functional constraints, 20:8560 (RA;US)
Towards DNA sequencing by hybridization, 20:8563 (RA;US)

Tennessee Dept. of Environment and Conservation, Oak Ridge, TN (United States). DOE Oversight Div.
Environmental monitoring plan, July 1–December 31, 1994, 20:7855 (R;US)
Environmental monitoring report, May 10, 1993–June 1, 1994, 20:7854 (R;US)

Tennessee Univ., Tullahoma, TN (United States). Space Inst.
High performance materials in coal conversion utilization. Technical progress report, July 1–September 30, 1994, 20:8140 (R;US)

Texaco Development Corp., White Plains, NY (United States)
SYNCHEM feasibility report: Phase 1, 20:7628 (R;US)

Texaco Exploration and Production, Inc., Midland, TX (United States)
CO_2 Huff-n-Puff process in a light oil shallow shelf carbonate reservoir. Quarterly technical progress report, 3rd quarter, 1994, 20:7224 (R;US)

Texaco Exploration and Production, Inc., New Orleans, LA (United States)
Post waterflood CO_2 miscible flood in light oil, fluvial - dominated deltaic reservoirs. Technical progress report, 4th quarter, fiscal year 1994, July 1, 1994–September 30, 1994, 20:7217 (R;US)

Texas A and M Univ., College Station, TX (United States). Dept. of Chemical Engineering
Fischer Tropsch synthesis in supercritical fluids. Quarterly technical progress report, July 1, 1994–September 30, 1994, 20:8182 (R;US)

Texas Univ., Arlington, TX (United States)
A feasibility study for a manufacturing technology deployment center, 20:8021 (R;US)

Texas Univ., Austin, TX (United States). Center for Particle Physics
Vacuum polarization by solitons in (1+1) dimensions, 20:8761 (IA;IR;In English, Persian)

Texas Univ., Austin, TX (United States). Center for Particle Theory
Vacuum polarization by solitons in (1+1) dimensions, 20:8761 (IA;IR;In English, Persian)

Texas Univ., Austin, TX (United States). Inst. for Fusion Studies
A wavenumber-partitioning scheme for two-dimensional statistical closures, 20:8973 (R;US)
On inertial range scaling laws, 20:8974 (R;US)

Texas Univ., Dallas, TX (United States)
Elementary particle physics. Progress report, July 1992–October 1994, 20:8784 (R;US)

Texas Univ., Dallas, TX (United States). Richardson Center for Advanced Studies
Shaft furnace gasification with regard to cogeneration of heat and power. Partial report no. 2: Gasification of straw - test 1-5, 20:7549 (R;DK;In Danish)

Tokyo Univ., Tanashi (Japan). Inst. for Nuclear Study
Atomic approaches in metastable antiprotonic helium atoms. REPLY to 'analysis of the lifetimes and fractions of antiprotons trapped in metastable antiprotonic-helium states' by I. Shimamura and M. Kimura, 20:8970 (R;JP)

Trondheim Univ. (Norway). Norges Tekniske Hoegskole
Dynamic simulation of the liquefaction section in baseload LNG plants, 20:8254 (R;NO)
Experimental investigation of an equilibrium boundary layer in strong adverse pressure gradient, 20:8253 (R;NO)
Studies on control of integrated plants, 20:8031 (R;NO)

Tulsa Univ., OK (United States)
Integrated approach towards the application of horizontal wells to improve waterflooding performance. Quarterly technical progress report, July 1–September 30, 1994, 20:7213 (R;US)

Tulsa Univ., OK (United States). Center for Environmental Research and Technology
Microbial reduction of SO_2 and NO_x as a means of by-product recovery/disposal from regenerable processes for the desulfurization of flue gas. Technical progress report, September 11, 1992–December 11, 1992, 20:7155 (R;US)

Turner, Mason and Associates, Dallas, TX (United States)
Reformulated gasoline study, executive summary, 20:7242 (R;US)

U

Umweltbehoerde, Hamburg (Germany). Amt. fuer Umweltschutz
Cadastre of discharges into bodies of water. Direct discharges. Year of survey: 1986, 20:8540 (R;DE;In German)

Union Carbide Chemicals and Plastics Co., Inc., South Charleston, WV (United States)
Heterogeneous catalytic process for alcohol fuels from syngas. Ninth quarterly technical progress report, January 1994–March 1994, 20:7565 (R;US)

Union Carbide Corp., South Charleston, WV (United States)
Heterogeneous catalytic process for alcohol fuels from syngas. Tenth quarterly technical progress report, April 1994–June 1994, 20:7566 (R;US)

Universidad Autonoma del Estado de Mexico, Toluca (Mexico). Escuela de Ciencias Quimicas
Effects of arsenic upon the no-disyuntion and X chromosome loss mechanisms in Drosophila melanogaster., 20:8616 (I;MX;In Spanish)
Influence of recD1013 and recJ284 mutations of Escherichia coli on indirect recombinogenesis of lambda phage., 20:8614 (I;MX;In Spanish)

Universidad Autonoma del Estado de Mexico, Toluca (Mexico). Facultad de Quimica
Ion exchange of Cobalt and Cadmium in Zeolite X., 20:8165 (I;MX;In Spanish)

Universidad Autonoma del Estado de Morelos (UAEM), Cuernavaca (Mexico)
^{10} Be and ^{26} Al production cross sections with 12 GeV protons measured by accelerator mass spectrometry., 20:8160 (IA;MX)
9. International symposium on nuclear chemistry, radiochemistry and radiation chemistry. Abstracts, 20:8214 (I;MX)
Action of glow discharge on organic solids: primary radiation-chemical processes, formation of radical distribution, radical reactions and application., 20:8203 (IA;MX)
Alpha-particle spectrum of ^{222} Rn and its daughters using silicon surface-barrier detectors., 20:8371 (IA;MX)
Analysis of Pre colombian Mexican golden pieces by X-ray fluorescence spectrometry., 20:8161 (IA;MX)
Application of the species existence-predominance and distribution diagrams to the plutonium and americium electrodeposition., 20:8215 (IA;MX)
Approximated expression for the dispersion EPR profile., 20:8984 (IA;MX)
Characterization of MMA/LDPE copolymer films obtained by gamma radiation., 20:8206 (IA;MX)
Comparison of radiochemical and spectrophotometric detection methods for HPLC-separated Cr(III) hydrolytic species., 20:8163 (IA;MX)
Crystallite size distribution in the synthesis of γ - $LiAlO_2$, 20:8187 (IA;MX)
Determination of U-235 enrichment on uranium materials by gamma spectrometry., 20:8162 (IA;MX)
Determining uranium enrichment by gamma spectrometry., 20:8158 (IA;MX)
Effects of chain orientation on the radiation response of atactic polystyrene., 20:8209 (IA;MX)
Efficiency curve determination of Si (Li) detector., 20:8372 (IA;MX)
Elimination of organics chemicals in aqueous solutions by gamma radiation processing., 20:8205 (IA;MX)
Emission Moessbauer spectroscopic studies on mixed valence states of Fe-57 atoms produced in Co-57 labelled trinuclear cobalt-iron carboxylates., 20:8157 (IA;MX)
ESR-TRIS system as a gamma dosimeter., 20:8373 (IA;MX)
Fast reactions in the positron spur in polar solvents., 20:8968 (IA;MX)
Fast successive charge captures in the positron spur by halogenated compounds in methanol., 20:8967 (IA;MX)
Identification of irradiated mangoes by the electron spin resonance technique., 20:8204 (IA;MX)
Impedance measurement of irradiated potatoes: a method to identify radiation processing., 20:8207 (IA;MX)
Photochemical reactions of $CuInSe_2$ thin films in sulphuric acid solution., 20:8201 (IA;MX)
Photonuclear reactions of complex nuclei at intermediate energies., 20:8912 (IA;MX)
PIXE analysis setup using a proton in air beam facility at the ININ., 20:8156 (IA;MX)
PIXE analysis setup using a proton in air beam facility at the ININ., 20:8315 (IA;MX)
Positronium interactions with transition metals in sodium dodecyl sulfate micellar systems (SDS)., 20:8969 (IA;MX)
Reduction of phenols, detergents and coliform bacteria in samples of waste water by gamma radiation processing., 20:8208 (IA;MX)
Sorption of radioactive Cobalt by sepiolite., 20:8216 (IA;MX)
Spectrophotometric method for the determination of Thorium in urine using anionic resin and arsenazo (III)., 20:8159 (IA;MX)
The influence of ionizing radiation on the formation of polymeric material from aqueous malononitrile., 20:8202 (IA;MX)
The lethal effect of gamma irradiation on the meta cestode of Taenia solium in pork., 20:8613 (IA;MX)

Universidad Autonoma Metropolitana, Mexico City (Mexico)
Sorption of radioactive cobalt with sepiolite and erionite., 20:8217 (I;MX;In Spanish)

Universidad Nacional Autonoma de Mexico, Mexico City (Mexico). Centro de Estudios Nucleares
The influence of ionizing radiation on the formation of polymeric material from aqueous malononitrile., 20:8202 (IA;MX)

Universite Mohammed 5, Rabat (Morocco). Faculte des Sciences
Measurement of volumic activities of radon in air in houses and in working rooms with solid state nuclear track detectors, 20:8452 (I;MA;In French)
Simulation of pressurized water reactor in accidental state., 20:7654 (I;MA;In French)
Study of radon-222 emanation from sedimentary phosphates and corresponding phosphogypsum. Temperature effect, 20:8491 (I;MA;In French)

University of Southern California, Los Angeles, CA (United States). Dept. of Chemical Engineering
Hindered diffusion of coal liquids. Quarterly report No. 8, June 18, 1994–September 17, 1994, 20:7136 (R;US)

University of Southern Mississippi, Hattiesburg, MS (United States). Dept. of Polymer Science
Responsive copolymers for enhanced petroleum recovery. Quarterly technical progress report, June 23–September 21, 1994, 20:8180 (R;US)

Uniwersytet Jagiellonski, Cracow (Poland). Dept. of Physics
Electronic structure and pairing of strongly correlated fermions: Fermi liquid versus spin liquid, 20:9029 (R;US)

UOP, Inc., Des Plaines, IL (United States)
Development of a catalyst for conversion of syngas-derived materials to isobutylene. Quarterly report number 11, October 1–December 31, 1993, 20:7563 (R;US)

Urmia Univ. (Iran, Islamic Republic of)
Increase gain of volume ignition, 20:9102 (IA;IR;In English, Persian)

USDOE Assistant Secretary for Conservation and Renewable Energy, Washington, DC (United States). Geothermal Div.
Geothermal Program Review 12: Geothermal Energy and the President's Climate Change Action Plan, 20:7607 (R;US)

USDOE Assistant Secretary for Defense Programs, Washington, DC (United States)
Plutonium Finishing Plant safety evaluation report, 20:7469 (R;US)

USDOE Assistant Secretary for Energy Efficiency and Renewable Energy, Washington, DC (United States)
Superconductivity Program for electric power systems: 1994 annual PEER review. Volume 1, Meeting proceedings, 20:9030 (R;US)
Superconductivity Program for electric power systems: 1994 annual PEER review. Volume 2, Meeting proceedings, 20:9031 (R;US)
Windows and daylighting: A brighter outlook, 20:7963 (R;US)

USDOE Assistant Secretary for Environment, Safety, and Health, Washington, DC (United States)
Human radiation experiments: The Department of Energy roadmap to the story and the records, 20:8611 (R;US)

USDOE Assistant Secretary for Environment, Safety, and Health, Washington, DC (United States). Office of Environmental Guidance and Compliance
Catalog of CERCLA applicable or relevant and appropriate requirements (ARARs) - fact sheets, 20:7859 (R;US)
Ignitable, corrosive, reactive, and incompatible wastes information brief, 20:7851 (R;US)

USDOE Assistant Secretary for Environment, Safety, and Health, Washington, DC (United States). RCRA/CERCLA Div.
CERCLA §103 and EPCRA §304 Release Notification Requirements update, 20:7852 (R;US)

USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States)
A practical method of hydrogen purification for use in fuel-cell systems, 20:7934 (RA;US)
Advances in research for solid oxide fuel cells, 20:7921 (RA;US)
Alternative materials for solid oxide fuel cells, 20:7922 (RA;US)
Carbonate fuel cell analysis, 20:7926 (RA;US)
Fuel cells - an international perspective, 20:7945 (RA;US)
Investigation of wetting phenomena and oxidation/lithiation behavior of nickel in molten carbonate, 20:7935 (RA;US)
Lithium ferrate and lithium cobaltate cathodes for molten carbonate fuel cells, 20:7925 (RA;US)
Macrocyclic redox promoters for direct methanol fuel cells, 20:7932 (RA;US)

MCFC development for logistic fuel applications, 20:7936 (RA;US)
Molten carbonate fuel cell with high power density, 20:7927 (RA;US)
Multiply manifolded molten carbonate fuel cells, 20:7924 (RA;US)
Overview of MCFC commercialization strategy, 20:7939 (RA;US)
Perovskite solid electrolytes for SOFC, 20:7933 (RA;US)
Phosphoric acid fuel cell for buses, 20:8061 (RA;US)
Pitting corrosion of aluminized seals in molten carbonate fuel cells, 20:7928 (RA;US)
Processing of $LaCrO_3$ for solid oxide fuel cell applications, 20:7929 (RA;US)
Proton exchange membrane fuel cell for transportation, 20:8060 (RA;US)
Sealant materials for the solid oxide fuel cell, 20:7930 (RA;US)
SOFC development for logistics fuel applications, 20:7937 (RA;US)
Solid oxide fuel cells material research, 20:7920 (RA;US)
Status of 120-kW direct fuel cell product improvement and testing, 20:7943 (RA;US)
Status of 250 kW product development test at San Diego Gas & Electric, 20:7942 (RA;US)
Status of Santa Clara MCFC product development test, 20:7941 (RA;US)
Status of Unocal product development testing, 20:7944 (RA;US)
Support research for solid oxide fuel cells, 20:7923 (RA;US)
The alliance to commercialize carbonate technology: A revitalized industry commitment to IMHEX® fuel cell commercialization, 20:7940 (RA;US)
Trace species removal for fuel cell application, 20:7931 (RA;US)
Tubular Solid Oxide Fuel Cell Development Program, 20:7918 (RA;US)
Tubular solid oxide fuel cell demonstration activities, 20:7919 (RA;US)
Update: Commercialization of the direct fuel cell, 20:7938 (RA;US)

USDOE Bartlesville Project Office, OK (United States)
Enhanced oil recovery. Progress review, October–December 1993, 20:7195 (R;US)
Geological and petrophysical characterization of the Ferron Sandstone for 3-D simulation of a fluvial-deltaic reservoir. Quarterly report, July 1–September 30, 1994, 20:7192 (R;US)

USDOE Bonneville Power Administration, Portland, OR (United States)
Blue Creek Winter Range: Wildlife Mitigation Project. Final environmental assessment, 20:7579 (R;US)
Screening analysis, volume 1 description and conclusions, August 1992, 20:7574 (R;US)

USDOE Economic Regulatory Administration, Washington, DC (United States). Office of Utility Systems
Area 5 Site characterization project report, FY 1994, 20:7443 (R;US)
Identification of potential groundwater flow paths using geological and geophysical data, 20:8650 (R;US)

USDOE Energy Information Administration, Washington, DC (United States). Energy Supply and Conversion Div.
Documentation of the petroleum market model (PMM). Appendix: Model developer's report, 20:7236 (R;US)

USDOE Energy Information Administration, Washington, DC (United States). Office of Coal, Nuclear, Electric and Alternate Fuels
Alternatives to traditional transportation fuels 1993, 20:8011 (R;US)
Electric power monthly: January 1995, with data for October 1994, 20:7905 (R;US)
Electric sales and revenue: 1993, 20:7907 (R;US)
Financial statistics of major U.S. investor-owned electric utilities 1993, 20:7906 (R;US)
Performance issues for a changing electric power industry, 20:7908 (R;US)

USDOE Energy Information Administration, Washington, DC (United States). Office of Energy Markets and End Use
International petroleum statistics report, 20:7234 (R;US)
Monthly energy review: January 1995, 20:7913 (R;US)

USDOE Energy Information Administration, Washington, DC (United States). Office of Integrated Analysis and Forecasting
Appendix model performance - model documentation renewable fuels module of the National Energy Modeling System, 20:7886 (R;US)
Model documentation natural gas transmission and distribution model (NGTDM) of the national energy modeling system. Volume II: Model developer's report, 20:7249 (R;US)

USDOE Energy Information Administration, Washington, DC (United States). Office of Oil and Gas
Petroleum marketing annual 1993, 20:7233 (R;US)
Petroleum marketing monthly: January 1995, with data for October 1994, 20:7232 (R;US)
The Energy Information Administration's assessment of reformulated gasoline: An update, 20:7238 (R;US)
Winter fuels report, 20:7235 (R;US)
Winter fuels report. Week ending: January 20, 1995, 20:7885 (R;US)

USDOE Fernald Field Office, OH (United States)
Draft final feasibility study report and proposed plan for Operable Unit 4, response to comments: Fernald Environmental Management Project, Fernald, Ohio, 20:7476 (R;US)

USDOE Morgantown Energy Technology Center, WV (United States)
A practical method of hydrogen purification for use in fuel-cell systems, 20:7934 (RA;US)
Advances in research for solid oxide fuel cells, 20:7921 (RA;US)
Aerovalve pulse combustion: Technical note, 20:8266 (R;US)
Alternative materials for solid oxide fuel cells, 20:7922 (RA;US)
Carbonate fuel cell analysis, 20:7926 (RA;US)
Fuel cells - an international perspective, 20:7945 (RA;US)
Fundamental Fluidization Research Project. Environmental Assessment, 20:7167 (R;US)
Investigation of wetting phenomena and oxidation/lithiation behavior of nickel in molten carbonate, 20:7935 (RA;US)
Lithium ferrate and lithium cobaltate cathodes for molten carbonate fuel cells, 20:7925 (RA;US)
Macrocyclic redox promoters for direct methanol fuel cells, 20:7932 (RA;US)
MCFC development for logistic fuel applications, 20:7936 (RA;US)
Molten carbonate fuel cell with high power density, 20:7927 (RA;US)
Multiply manifolded molten carbonate fuel cells, 20:7924 (RA;US)
Overview of MCFC commercialization strategy, 20:7939 (RA;US)
Perovskite solid electrolytes for SOFC, 20:7933 (RA;US)
Phosphoric acid fuel cell for buses, 20:8061 (RA;US)
Pilot gasification and hot gas cleanup operations, 20:7108 (R;US)
Pitting corrosion of aluminized seals in molten carbonate fuel cells, 20:7928 (RA;US)
Processing of $LaCrO_3$ for solid oxide fuel cell applications, 20:7929 (RA;US)
Proton exchange membrane fuel cell for transportation, 20:8060 (RA;US)
Sealant materials for the solid oxide fuel cell, 20:7930 (RA;US)
SOFC development for logistics fuel applications, 20:7937 (RA;US)
Solid oxide fuel cells material research, 20:7920 (RA;US)
Status of 120-kW direct fuel cell product improvement and testing, 20:7943 (RA;US)
Status of 250 kW product development test at San Diego Gas & Electric, 20:7942 (RA;US)
Status of Santa Clara MCFC product development test, 20:7941 (RA;US)
Status of Unocal product development testing, 20:7944 (RA;US)
Support research for solid oxide fuel cells, 20:7923 (RA;US)
The alliance to commercialize carbonate technology: A revitalized industry commitment to IMHEX® fuel cell commercialization, 20:7940 (RA;US)
Trace species removal for fuel cell application, 20:7931 (RA;US)
Tubular Solid Oxide Fuel Cell Development Program, 20:7918 (RA;US)
Tubular solid oxide fuel cell demonstration activities, 20:7919 (RA;US)
Update: Commercialization of the direct fuel cell, 20:7938 (RA;US)

USDOE Naval Petroleum Reserves in California, Tupman, CA (United States)
Final joint environmental assessment for the construction and routine operation of a 12-kilovolt (KV) overhead powerline right-of-way, and formal authorization for a 10-inch and 8-inch fresh water pipeline right-of-way, Naval Petroleum Reserve No. 1, Kern County, California, 20:7824 (R;US)

USDOE Office of Energy Research, Washington, DC (United States)
ELSI Bibliography: Ethical, legal and social implications of the Human Genome Project. 1994 Supplement, 20:8578 (R;US)
USDOE Office of Energy Research, Washington, DC (United States). Engineering and Geosciences Div.
Summaries of FY 1994 geosciences research, 20:8648 (R;US)
USDOE Office of Energy Research, Washington, DC (United States). Office of Basic Energy Sciences
Summaries of FY 1994 engineering research, 20:7871 (R;US)
USDOE Office of Energy Research, Washington, DC (United States). Office of Scientific Computing
Positioning the electric utility to build information infrastructure, 20:7909 (R;US)
USDOE Office of Inspector General, Oak Ridge, TN (United States). Eastern Regional Audit Office
Audit of administration of the Department of Energy's small disadvantaged business program, 20:9130 (R;US)
USDOE Office of Inspector General, Washington, DC (United States). Office of Inspections
Report on the inspection of the status of the disposal of technical Surveillance Equipment at the Central Training Academy, Albuquerque, New Mexico, 20:9131 (R;US)
USDOE Office of Science Education and Technical Information, Washington, DC (United States)
MOLIS: Minority On-Line Information Service: User's guide. Version 3.0/Release 3.0, 20:9128 (R;US)
USDOE Office of Small and Disadvantaged Business Utilization, Washington, DC (United States)
Forecast of Contracting and Subcontracting Opportunities, Fiscal year 1995, 20:7870 (R;US)
USDOE Pittsburgh Energy Technology Center, PA (United States)
Fluorescent image tracking velocimeter, 20:8592 (PA;US)
Method of and system for producing electrical power, 20:7259 (PA;US)
USDOE, Washington, DC (United States)
Alternative systematic approaches to training, 20:7470 (R;US)
Center for Molecular Electronics, University of Missouri, St. Louis. Environmental Assessment, 20:8226 (R;US)
Manual of functions, assignments, and responsibilities for nuclear safety: Revision 2, 20:7783 (R;US)
Technology transfer 1995, 20:7874 (R;US)
Transition report, United States Department of Energy: A report to the President-Elect. Volume 1, 20:7872 (R;US)
Transition report, United States Department of Energy: A report to the President-Elect. Volume 2, 20:7873 (R;US)
Utah Univ., Salt Lake City, UT (United States)
Novel process for depolymerization of coal to C_2-C_4 hydrocarbons. Final report, 1 September 1989–31 August 1993, 20:7111 (R;US)
Refining of fossil resin flotation concentrate from western coal. Seventh quarter final report, July 1, 1994–September 30, 1994, 20:7146 (R;US)
UTD, Inc., Newington, VA (United States)
Innovative directional and position specific sampling technique. Phase 3: Final report, July 1992–September 1994, 20:8416 (R;US)

V

Vattenfall Utveckling AB, Vaellingby (Sweden)
Cadmium in Salix. A study to show the capacity of Salix to remove cadmium from farmland, 20:8517 (R;SE;In Swedish)
Virginia Center for Coal and Minerals Processing, Blacksburg, VA (United States)
Development of enhanced sulfur rejection processes. Final technical progress report, fifth quarter, October 1–December 31, 1993, 20:7135 (R;US)
Development of enhanced sulfur rejection processes. Final technical progress report, July 1–September 30, 1993, 20:7097 (R;US)
Virginia Polytechnic Inst. and State Univ., Blacksburg, VA (United States)
Investigation of properties and performance of ceramic composite components. Final report on Phase 2, 20:8143 (R;US)
Voelund R og D Center, Kolding (Denmark)
Shaft furnace gasification with regard to cogeneration of heat and power. Partial report no 5 - Final report. Gasification of wood chips - test 8-9. Gasification of straw - test 10-14, 20:7550 (R;DK;In Danish)
Shaft furnace gasification with a view to to cogeneration of heat and power. Partial report no 4: Straw gasification - tests 6-7: gas washing, 20:7551 (R;DK;In Danish)
Vortec Corp., Collegeville, PA (United States)
A coal-fired combustion system for industrial process heating applications. Quarterly technical progress report, April 1994–June 1994, 20:7172 (R;US)
Vsesoyuznyj Nauchno-issledovatel'skij i Proektnyj Inst. Ehnergotekhniki (VNIPIEhT), Moscow (Russian Federation)
Complex probabilistic estimation of seismic resistance of nuclear power plants, 20:8495 (R;RU;In Russian)
VTT Energy, Jyvaeskylae (Finland). Biofuels
Research projects in 1994, 20:7541 (R;FI;In Finnish, English)

W

Washington State Univ., Richland, WA (United States)
Transport in porous and fractured media of the Creede Formation, 20:7606 (R;US)
Washington Univ., Seattle, WA (United States)
Landau-Zener treatments of solar neutrino oscillations, 20:8688 (R;US)
Pseudo-Goldstone modes in isospin-asymmetric nuclear matter, 20:8853 (R;US)
Washington Univ., Seattle, WA (United States). Inst. for Nuclear Theory
Shock compression and expansion in central collisions, 20:8908 (R;US)
The off-shell axial anomaly via the $\gamma^*\pi^0 \rightarrow \gamma$ transition, 20:8826 (R;US)
Washington Univ., St. Louis, MO (United States). Dept. of Physics
Update on B_K with Wilson fermions, 20:8711 (R;US)
West Valley Nuclear Services Co., Inc., West Valley, NY (United States)
Slanted baffle mist eliminator, 20:7337 (PA;US)
West Virginia Univ., Morgantown, WV (United States)
Hydrocarbon-oil encapsulate bubble flotation of fine coal. Technical progress report for the seventh quarter, April 1, 1992–June 30, 1992, 20:7090 (R;US)
Hydrocarbon-oil encapsulate bubble flotation of fine coal. Technical progress report for the eighth quarter, July 1, 1992–September 30, 1992, 20:7091 (R;US)
Hydrocarbon-oil encapsulated air bubble flotation of fine coal. 1st Quarterly report, October 1, 1990–December 31, 1990, 20:7088 (R;US)
Hydrocarbon-oil encapsulated air bubble flotation of fine coal. Technical progress report for the second quarter, January 1, 1991–March 31, 1991, 20:7093 (R;US)
Hydrocarbon-oil encapsulated air bubble flotation of fine coal. Technical progress report for the fifth quarter, October 1, 1991–December 30, 1991, 20:7166 (R;US)
Hydrocarbon-oil encapsulated bubble flotation of fine coal. Technical progress report for the sixth quarter, January 1, 1992–March 30, 1992, 20:7089 (R;US)
Hydrocarbon-oil encapsulated bubble flotation of fine coal. Technical progress report for the fourth quarter, July 1, 1991–September 30, 1991, 20:7095 (R;US)
West Virginia Univ., Morgantown, WV (United States). Dept. of Mineral Processing Engineering
Hydrocarbon-oil encapsulated air bubble flotation of fine coal. Technical progress report for the third quarter, April 1, 1991–June 30, 1991, 20:7094 (R;US)
Hydrocarbon-oil encapsulated bubble flotation of fine coal. Technical progress report for the ninth quarter, October 1, 1992–December 31, 1992, 20:7092 (R;US)

Western Kentucky Univ., Bowling Green, KY (United States). Dept. of Chemistry

Co-firing high sulfur coal with refuse derived fuels. Technical progress report No. 1, [September–November 1994], 20:7179 (R;US)

Westinghouse Electric Corp., West Mifflin, PA (United States)

Apparatus for restraining and transporting dies, 20:8242 (PA;US)

Westinghouse Hanford Co., Richland, WA (United States)

183-H basin sludge treatability testing program plan, 20:7384 (R;US)

200 Area TEDF interface control document, 20:7383 (R;US)

200 Area treated effluent disposal facility operational test specification, 20:7374 (R;US)

241-BY-106 sampling test plan, 20:7420 (R;US)

242-A Evaporator Condensate Tank (TK-C-100) tie down evaluation, 20:7499 (R;US)

242-A Evaporator ion exchange column (IX-D-1) tie down evaluation, 20:7391 (R;US)

291-B-1 stack monitoring and sampling system annual system assessment report, 20:7459 (R;US)

45-Day safety screening for Tank 241-C-103 push mode sample, riser 2, 20:7500 (R;US)

Accelerated characterization of metal fuel stored in the Hanford K basins, 20:7372 (R;US)

Accelerated safety analyses - structural analyses Phase I - structural sensitivity evaluation of single- and double-shell waste storage tanks, 20:7407 (R;US)

Acceptance test procedure for the MO-294 Building, 20:7373 (R;US)

Acceptance test procedure for the 340-NT-EX stack upgrades. Project W-337, 20:7457 (R;US)

Acceptance test procedure, 241-SY-101 Flexible Receiver System, Phase III testing, 20:7392 (R;US)

Addendum 3 to CSAR 80-027, Use of calorimeter 109B for fissile material measurement, 20:8246 (R;US)

BCP selector valves and limit switches, 20:7381 (R;US)

Calibration of the radionuclide logging system germanium detector, 20:8410 (R;US)

Caustic addition system operability test procedure, 20:7404 (R;US)

Chemistry of proposed calcination/dissolution processing of Hanford Site tank wastes, 20:7369 (R;US)

Cone penetrometer testing at the Hanford Site: Final performance evaluation report, 20:7490 (R;US)

Criticality safety evaluation report for the 100 KE Basin sandfilter backwash pit, 20:7375 (R;US)

Criticality safety evaluation report for K Basin filter cartridges, 20:7376 (R;US)

CSER 94-014: Storage of metal-fuel loaded EBR-II casks in concrete vault on PFP grounds, 20:8245 (R;US)

DACS upgrade acceptance test report, 20:7394 (R;US)

Design criteria for the light duty utility arm system end effectors, 20:7379 (R;US)

Design review report FFTF interim storage cask, 20:7283 (R;US)

Detection and quantitative analysis of ferrocyanide and ferricyanide: FY 93 Florida State University Raman spectroscopy report, 20:8178 (R;US)

Economic transition FY 1995 Multi-Year Program Plan (MYPP)/Fiscal Year Work Plan (FYWP) WBS 7.4.9, 20:9152 (R;US)

Engineering scale mixing system tests for MWTF title II design, 20:7386 (R;US)

Engineering test plan for Tank 241-SY-101 in situ viscometer. Revision 1, 20:7418 (R;US)

Estimation and characterization of decontamination and decommissioning solid waste expected from the Plutonium Finishing Plant, 20:7368 (R;US)

Evaluation of AY/AZ tank farm ventilation system during aging waste retrieval operations, 20:7412 (R;US)

Evaluation of plasma melter technology for verification of high-sodium content low-level radioactive liquid wastes: Demonstration test No. 4 preliminary test report, 20:7422 (R;US)

Evaluation of storing Shippingport Core II spent blanket fuel assemblies in the T Plant PWR Core II fuel pool without active cooling, 20:7666 (R;US)

Evaporation analysis for Tank SX-104, 20:7399 (R;US)

Fire hazard analysis for the Westinghouse Hanford Company managed low-level mixed waste Trench 31 and 34, 20:7502 (R;US)

Geophysical investigation of 216-U-8 clay vitrified pipe transfer line, 200 West Area, 20:7456 (R;US)

Global modeling of Hanford tank waste pretreatment alternatives within a total cleanup system using ASPEN PLUS™, 20:7371 (R;US)

Ground water impact assessment report for the 216-B-3 Pond system, 20:7455 (R;US)

Grout gas generation test plan, 20:7416 (R;US)

Hanford analytical sample projections FY 1995–FY 2000. Revision 1, 20:7413 (R;US)

High-heat tank safety issue resolution program plan. Revision 2, 20:7489 (R;US)

Historical Tank Content Estimate for the Northwest Quandrant of the Hanford 200 East Area, 20:7400 (R;US)

Historical Tank Content Estimate for the Southwest Quandrant of the Hanford 200 West Area, 20:7401 (R;US)

Hydrogen production in the K-Basin ion exchange columns, modules and cartridge filters, 20:7377 (R;US)

Information systems of the future: Rights and responsibilities, 20:9196 (R;US)

Inspection system performance test procedure, 20:7393 (R;US)

Interim essential and support drawing list for K Basins, 20:7284 (R;US)

Leachate storage transport tanker loadout piping, 20:7382 (R;US)

Light Duty Utility Arm interface control document plan, 20:7380 (R;US)

Liquid Effluent Monitoring Information System (LEMIS) test plans release 1.0, 20:7415 (R;US)

Load test of the 277W Building high bay roof deck and support structure, 20:7494 (R;US)

Low-Level Waste Vitrification Plant Project contracting strategy decision analysis report, 20:7390 (R;US)

National standard and code compliance for electrical equipment installed in hazardous locations for the void fraction instrument, 20:7396 (R;US)

Operability test procedure for the 340-NT-EX stack upgrades – Project W337, 20:7458 (R;US)

Operability test procedure for the TK-900 effluent monitoring station, 20:7406 (R;US)

Operability test procedure [Tank] 241-SY-101 equipment removal system, 20:7405 (R;US)

Potential tank waste material anomalies located near the liquid observation wells: Model predicted responses of a neutron moisture detection system, 20:7367 (R;US)

Project management plan, Hazardous Materials Management and Emergency Response Training Center, 20:7498 (R;US)

Project Specific Quality Assurance Plan (QAPP), 20:7388 (R;US)

Project W-340 long reach arm retrieval system balance of plant instrumentation workshop engineering study, 20:7389 (R;US)

Purex canyon exhaust fan bearing temperature monitoring system doric 245 datalogger programming, 20:7408 (R;US)

Quality assurance FY 1995 site support program plan WBS 6.7.2.5, 20:7424 (R;US)

Quality Assurance Project Plan for Facility Effluent Monitoring Plan activities, 20:8518 (R;US)

Report of clean out and flushing of UO_3 Plant processing equipment: Revision 1, 20:7492 (R;US)

Results of falling barrier analyses, 20:7378 (R;US)

Rollover analysis of rotary mode core sampler truck No. 2, 20:7501 (R;US)

Sample Exchange Evaluation (SEE) Report - Phase II, 20:7414 (R;US)

Sealed canister liquid sampling for fuel characterization shipments, 20:8636 (R;US)

Search Hanford accessible reports electronically system configuration management plan, 20:7287 (R;US)

Single Shell Tank Waste Characterization Project for Tank B-110, Core 9 - data package and PNL validation summary report, 20:7398 (R;US)

Soil weight (lbf/ft^3) at Hanford waste storage locations (2 volumes), 20:7409 (R;US)

Storage options for Long Length Contaminated Equipment (LLCE) items, 20:7402 (R;US)
Strategy for sampling Hanford Site tank wastes for development of disposal technology, 20:7410 (R;US)
Structural evaluation of thermocouple probes for 241-AZ-101 waste tank, 20:7385 (R;US)
Summary of fiscal year 1994 near-infrared spectroscopy moisture sensing activities, 20:7370 (R;US)
Summary report of Hanford Site well remediation and decommissioning activities for fiscal year 1994, 20:7493 (R;US)
T Plant hazards assessment, 20:7495 (R;US)
Tank 241-C-102 tank characterization plan, 20:7417 (R;US)
Tank 241-SY-103 auger samples, risers 7A, 14B and 22A, 20:7397 (R;US)
Tank 241-TX-105 tank characterization plan, 20:7419 (R;US)
Tank SY-101 void fraction instrument functional design criteria, 20:7403 (R;US)
Tank vapor mitigation requirements for Hanford Tank Farms, 20:7387 (R;US)
Tank Waste Remediation System tank waste pretreatment and vitrification process development testing requirements assessment, 20:7411 (R;US)
Test and evaluation report, U.S. Department of Transportation Specification 7A Type A radioactive material packaging, WHC Solid Sample Package (unshielded) (3M SafeSend® Reusable Super Pack Shipping System [SP-R1L Kit]), 20:8248 (R;US)
Test plan for a U.S. Department of Transportation Specification 7A Type A radioactive material packaging, WHC Liquid Sample Package (unshielded) (3M SafeSend® Reusable Super Pack Shipping System [SP-R1L Kit]), 20:8247 (R;US)
Test report – Prototype core sampler, 20:7421 (R;US)
Unreviewed safety question evaluation of 100K East and 100K West in-basin fuel characterization program activities, 20:7496 (R;US)
Unreviewed safety question evaluation of 100 K West fuel canister gas and liquid sampling, 20:7497 (R;US)
Vault Safety and Inventory System users manual, PRIME 2350. Revision 1, 20:7512 (R;US)
Virtual reality and stereoscopic telepresence, 20:7491 (R;US)
Wind and seismic analysis for liquid-level gauge support, 20:7395 (R;US)
Work plan for upgrading the 241-A-701 compressed air system and motor control center. Revision 1, 20:7423 (R;US)
Workflow automation architecture standard, 20:9151 (R;US)

Westinghouse Savannah River Co., Aiken, SC (United States)
Analysis of glycerin waste in A-Area sanitary treatment facility material, 20:7436 (R;US)
Apparatus for unloading pressurized fluid, 20:7822 (PA;US)
Autonomous mobile robot for radiologic surveys, 20:8241 (PA;US)
Cesium cobaltdicarbollide-solubility, precipitation, and reactivity in basic aqueous solution, 20:7433 (R;US)
Characterization of high-level waste saltcake stored at the Savannah River Site, 20:7425 (R;US)
Deflagration-induced pressure and temperature transients in a waste storage facility, 20:7427 (R;US)
Department of Energy Plutonium ES&H Vulnerability Assessment Savannah River Site interim compensatory measures, 20:7286 (R;US)
Development of a Transportable Vitrification System for Mixed Waste, 20:7432 (R;US)
Development of Liquid Level and Density Bubbler for DWPF Canyon Vessels. Final report, 20:7439 (R;US)
Equivalence relations for the 9972-9975 SARP, 20:7285 (R;US)
Evaluation of the effectiveness of the sealed double-ringed infiltrometers and the effects of changes in atmospheric pressure on hydraulic conductivity, 20:7438 (R;US)
Experimental Chemical Milling Process to Decontaminate and Disposition Reactor Fuel at the Savannah River Site, 20:7431 (R;US)
F-Area Acid/Caustic Basin groundwater monitoring report: Third quarter 1994, 20:8520 (R;US)
FY94 Office of Technology Development Mixed Waste Operations Robotics Demonstration, 20:7504 (R;US)
Hazards assessment document for receiving basin for offsite fuel (244-H) and resin regeneration facility (245-H) (RBOF/RRF), 20:8637 (R;US)
High-level waste management technology program plan, 20:7315 (R;US)
Human Reliability Analysis for In-Tank Precipitation Alignment and Startup of Emergency Purge Ventilation Equipment. Revision 3, 20:7505 (R;US)
Integration of heterogeneous data bases for development of a large-scale environmental data atlas for multi-platform PC and workstation users, 20:7503 (R;US)
Linear optocoupler, 20:8274 (PA;US)
Magnetic Survey of the Hydroflouric Acid Spill Area, 20:7464 (R;US)
Mass transfer model for two-layer TBP oxidation reactions, 20:7437 (R;US)
Melter feed tank operating map from the FA-10.02 test data, 20:7434 (R;US)
Metallurgical Laboratory Hazardous Waste Management Facility groundwater monitoring report. Third quarter, 1994, 20:7463 (R;US)
Method and apparatus for optical temperature measurement, 20:8412 (PA;US)
Mixed Waste Management Facility groundwater monitoring report. Second quarter 1994, 20:8519 (R;US)
Nuclear criticality safety evaluation – DWPF Late Wash Facility, Salt Process Cell and Chemical Process Cell, 20:8227 (R;US)
P-Area Acid/Caustic Basin groundwater monitoring report, second quarter 1994, 20:7507 (R;US)
P-Area Acid/Caustic Basin groundwater monitoring report: Third quarter 1994, 20:8521 (R;US)
Passive control of VOCs using valved well heads: FY1994 report, 20:7508 (R;US)
Radiolytic Hydrogen Production During the Long Term Storage of Spent Organic Ion Exchange Resins, 20:7430 (R;US)
Residual Stress Measurements with Laser Speckle Correlation Interferometry and Local Heat Treating, 20:7697 (R;US)
Sampling and analysis of soil from the old F-Area effluent ditch and its surrounding wetlands, 20:7435 (R;US)
Sanitary Landfill groundwater monitoring report: Third quarter 1994, 20:8522 (R;US)
Savannah River Technology Center monthly report: June 1994, 20:7260 (R;US)
Savannah River Technology Center monthly report: August 1994, 20:7261 (R;US)
Tank 41H bounding uranium enrichment. Revision 1, 20:7506 (R;US)
Tetraethyl orthosilicate-based glass composition and method, 20:8172 (PA;US)
The stainless steel beneficial reuse integrated demonstration, 20:7428 (R;US)
Thirty-Year Solid Waste Generation Forecast by Treatability Group, 20:7461 (R;US)
Thirty-Year Solid Waste Generation Maximum and Minimum Forecast for SRS, 20:7462 (R;US)
Upfront Delisting of F006 Mixed Waste, 20:7440 (R;US)
Verification of the MAXIGASP and POPGASP Computer Codes for Environmental Dose Assessment, 20:7460 (R;US)
Vitrification Studies with DOE Low-Level Mixed Waste Wastewater Treatment Sludges, 20:7429 (R;US)

Weston (Roy F.), Inc./Vectra Government Services, Inc. (United States)
Mixed Waste Management Facility Preliminary Safety Analysis Report. Chapters 1 to 20, 20:7363 (R;US)

Wisconsin Univ., Madison, WI (United States). Dept. of Physics
MHD simulations of DC helicity injection for current drive in tokamaks, 20:9046 (R;US)

Wisconsin Univ., Madison, WI (United States). Plasma Physics Research
Advances and prospects in reversed field pinch research, 20:9045 (R;US)
Transport reduction by current profile control in the reversed field pinch, 20:9044 (R;US)

Worcester Polytechnic Inst., MA (United States)
Laboratory instrumentation modernization at the WPI Nuclear Reactor Facility, 20:7766 (R;US)

Personal Author Index

Authors' surnames are indexed in the form appearing in the publication cited; given names generally have been reduced to initials. For documents with multiple authors, each author name is indexed. The entry for a primary author (first author listed on an abstracted document) includes the full document title and citation number. Entries for other authors provide a cross-reference to the primary author. Also included is information on the document type, country of publication, and the document language listed in parentheses in the format (J;FR;In French and English). Accent marks are not input because of computer alphabetization. Spelling and transliteration follow standard conventions.

A

Aakesson, M, *See* Nilsson, Peter, 20:7562

Aalto, P., *See* Ahonen, T., 20:8444

Abbe, J.Ch., *See* Didierjean, F., 20:8967

Abbott, J.G., Possible future directions for extruded polystyrene foam insulation, 20:7987 (RA;US)

Abdel Wahab, S.M., *See* Mansour, H.M.M., 20:8955

Abdelfattah, A.T., Environmental monitoring at Inshas area, 20:8454 (IA;EG)

Abdelmalik, W.E.Y., Transport of radionuclides in fresh water stream, 20:8539 (IA;EG)

Abraamyan, Kh.U., Inclusive π^0 Production in pC and pCu Interactions at 4,5 GeV/c, 20:8936 (R;XJ;In Russian)

Abramov, A., Hydrogen trapping in nickel pre-implanted with helium, 20:9101 (RA;IL)

Abramov, E., Surface behavior of first-wall due to the synergistic effect of helium and hydrogen isotopes, 20:9100 (RA;IL)
See Moreno, D., 20:9098

Abrefah, J., *See* Makenas, B.J., 20:7372

Ackerman, J.P., Process to remove rare earth from IFR electrolyte, 20:7278 (PA;US)

Adam, J., Design (Ge-BGO+NaI(Tl)) of Anti-Compton Spectrometer, 20:8385 (R;XJ;In Russian)
The Calculation of the Main Characteristics of Ge(Li)-NaI(Tl) Anti-Compton Spectrometer by Monte Carlo Method, 20:8384 (R;XJ;In Russian)

Adam, S.T., *See* Schreiber, G.A., 20:8600

Adamov, E.O., The design concept of an on-line diagnosis system of a sophisticated technological object: The shell of expert diagnosis system "Dasha", 20:7722 (RA;XA)

Adams, R.G., *See* Filuk, A.B., 20:9126

Adams, R.T., Liquid Effluent Monitoring Information System (LEMIS) test plans release 1.0, 20:7415 (R;US)

Adams, S., Cyclopentane as blowing agent for rigid polyurethane foam in refrigerator insulation, 20:8035 (RA;US)

Adel, G., *See* Yoon, R.H., 20:7097, 20:7135

Ades, M.J., Deflagration-induced pressure and temperature transients in a waste storage facility, 20:7427 (R;US)

Adewumi, M.A., Development of a cost effective environment compliance technology for stripper brine wells. Quarterly report, July 1, 1994–September 30, 1994, 20:7239 (R;US)

Adeyiga, A.A., *See* Jothimurugesan, K., 20:7109

Adjepong, S.K., *See* Mensah, S.Y., 20:8696

Adkins, D.R., Silicon heat pipes for cooling electronics, 20:8257 (R;US)
See Shen, D.S., 20:8279

Adkisson, B.P., Technical Support Section annual work plan for FY 1995, 20:9149 (R;US)

Admon, U., *See* Kimmel, G., 20:8155

Adorjan, F., Upgrading the VERONA core monitoring system, 20:7713 (RA;XA)

Afanas'ev, G.N., The Interaction of Magnetizations with an External Electromagnetic Field and a Time-Dependent Magnetic Aharonov-Bohm Effect, 20:8733 (R;XJ)

Afanas'ev, S.V., MRS Silicon Avalanche Detectors with Negative Feedback for Time-of-Flight Systems, 20:8376 (RA;XJ)

Afarideh, H., *See* Kamali Moghadam, K., 20:8945

Afonenko, A.A., *See* Kononenko, V.K., 20:8694

Agg, P.J., Modelling gas generation in radioactive waste repositories, 20:7288 (R;GB)

Aghamohammadi, A., On the inhomogeneous quantum groups, 20:8726 (IA;IR;In English, Persian)

Aguilar, I., *See* Holz, R., 20:8049

Ahharoni, D., *See* Ankry, N., 20:8352

Ahlgren, E.O., Thermoelectric power of solid oxide fuel cell materials, 20:7946 (R;DK)

Ahmad, B., *See* Aziz, A., 20:7778

Ahmadeev, R.G., *See* Anosov, A.I., 20:7725

Ahmed, T., *See* Ayazuddin, S.K., 20:7775

Ahn, Do Hee, *See* Sung, Ki Woung, 20:8171

Ahn, Y.S., *See* Yang, J.H., 20:7830

Ahonen, P.P., *See* Valmari, S.T., 20:7637

Ahonen, T., Correlations between CN and SO_2 concentrations at Vaerrioe research station, 20:8444 (RA;FI)

Aitken, E.A., *See* Colton, N.G., 20:7338

Aittomaeki, A., *See* Haerkoenen, M., 20:8260

Ajay Kumar Bisoi, Newton Raphson method, scaling at fractal boundaries and Mathematica, 20:8669 (R;XA)

Akabani, G., *See* McDonald, J.C., 20:8395

Akgerman, A., Fischer Tropsch synthesis in supercritical fluids. Quarterly technical progress report, July 1, 1994–September 30, 1994, 20:8182 (R;US)

Akkerman, A., Track effects and their influence on heavy ion energy losses in semiconductor devices, 20:8405 (RA;IL)
See Giberkhteerman, A., 20:8993
See Ilberg, D., 20:8408
See Levinson, J., 20:8404
See Lifshitz, Y., 20:8407

Aksenov, V.L., *See* Maayouf, R.M.A., 20:8947

Aksinenko, V.D., Streamer Chamber Memory Time Measurement with an Auxiliary Spark Chamber, 20:8387 (R;XJ;In Russian)
See Avramenko, S.A., 20:8928

Aktor, H., *See* Christensen, T., 20:8502

Akyurtlu, A., Investigation of combined SO_2/NO_x removal by Ceria sorbents. Quarterly technical progress report, July 1994–September 1994, 20:7154 (R;US)

Alakangas, E., Research projects in 1994, 20:7541 (R;FI;In Finnish, English)

Alanko, M., *See* Qian Mingsen, 20:7580, 20:7581

Albarran, G., *See* Negron Mendoza, A., 20:8202

Albinsson, Y., *See* Wanner, H., 20:8195

Albright, W., Area 5 Site characterization project report, FY 1994, 20:7443 (R;US)

Alder, M.S., The geometry of weak solutions of certain integrable nonlinar PDE's, 20:9178 (R;US)

Alefeld, G., Absorption technology, 20:7994 (RA;US)

Alessi, J.G., Possible use of the AGS linac for proton therapy, 20:8283 (R;US)

Alexander, G.M., Staff exchange with Spokane Intercollegiate Research and Technology Institute (SIRTI), final project report, 20:7878 (R;US)
Alexander, N., The Mott-Schwinger effect in neutron elastic scattering from ^{209}Bi, 20:8941 (R;AU)
Alfredsson, V., Zeolites - a high resolution electron microscopy study, 20:8128 (R;SE)
Ali, M., *See* Sajjad, M.I., 20:8174
Ali, R., The interactions of high-energy, highly charged Xe ions with buckyballs, 20:8958 (R;US)
Ali-Arshad, S., *See* Fasoli, A., 20:9073
Aliev, R.M., The Possibility to Investigate J/Ψ production and Gluon Distributions Using Muon Beam of U-600, 20:8925 (R;XJ)
Alimov, A.S., The (γ, γ')-experiment at the injection for the Moscow racetrack microtron, 20:8921 (IA;RU)
Allen, L.J., *See* Josefsson, T.W., 20:9018
See Lun, D.R., 20:8878, 20:8964
See Rossouw, C.J., 20:9013
See Steward, C., 20:8939, 20:8942
Allgeier, H.J., Energy research in the European Union, 20:7840 (IA;CH)
Allison, J.W., Apparatus for restraining and transporting dies, 20:8242 (PA;US)
Allison, M.L., Geological and petrophysical characterization of the Ferron Sandstone for 3-D simulation of a fluvial-deltaic reservoir. Quarterly report, July 1–September 30, 1994, 20:7192 (R;US)
Allison, S., *See* Hendrickson, L., 20:8308
Allotey, F.K.A., *See* Mensah, S.Y., 20:8696
Allshouse, G.O., *See* Filuk, A.B., 20:9126
Almagri, A.F., *See* Sarff, J.S., 20:9044
Almgren, A.S., *See* Pember, R.B., 20:8220
Alpeev, A.S., Classification of NPP operator support systems and problems with their implementation, 20:7716 (RA;XA)
Alpha, A., The use of nuclear techniques in hydrosedimentology: Principle and application in Mali, 20:8534 (RA;XA;In French)
See Sissoko, M.F., 20:8487
Alsmeyer, H., Molten core cooling systems for future PWR plants, 20:7797 (RA;DE;In German)
The COMET concept, 20:7807 (RA;DE;In German)
Alsum, S.K., *See* Shem, L.M., 20:7253
Altaisky, M.V., On quantization of self-similar systems, 20:8671 (R;XA)
Alurralde, M., *See* Levinson, J., 20:8404
Alvarado, D., *See* Bhown, A.S., 20:7635
Alwardt, L.D., Unreviewed safety question evaluation of 100K East and 100K West in-basin fuel characterization program activities, 20:7496 (R;US)
Unreviewed safety question evaluation of 100 K West fuel canister gas and liquid sampling, 20:7497 (R;US)
Ambrose, K.R., *See* Knapp, F.F. Jr., 20:8218
Ammon, J., *See* Schreiber, G.A., 20:8600, 20:8601
Amos, K., *See* Alexander, N., 20:8941
See Dortmans, P.J., 20:8745, 20:8820
See Katsogiannis, A., 20:8821
See Lun, D.R., 20:8878, 20:8964
See Steward, C., 20:8939, 20:8942
Amuda, R., *See* Daniel, M., 20:9024
Amusia, M.Ya., Atoms as many-body systems, 20:8951 (R;US)
An, Do Hui, *See* Chung, Heung Seok, 20:7515
An, Kwang Il, *See* Park, Chang Kyu, 20:9171
See Yoo, Keon Joong, 20:7657
An, Seon Soo, *See* Hwang, Sung Tai, 20:7678
An, Seong Ho, *See* Kim, Yong Seong, 20:7773
Ananikian, N.S., Multisite antiferromagnetic Ising spin model: Phase transition through doubling bifurcation, 20:8979 (R;XA)
Anastasov, A., Nuclear Structure by Laser Spectroscopy, 20:8863 (R;XJ)
Andersen, N.H., *See* Tomy, C.V., 20:8982
Anderson, D.F., Low-pressure micro-strip gas chamber and a search for a high-efficiency secondary-electron emitter, 20:8347 (R;US)
Anderson, H.U., *See* Huebner, W., 20:7929
Anderson, J.C., Secondary oil recovery from selected Carter sandstone oilfields–Black Warrior Basin, Alabama. Final report, 20:7214 (R;US)
Anderson, R., *See* Brumby, S.P., 20:8707
Anderson, R.E., Failure analysis: Status and future trends, 20:8222 (R;US)
Anderson, T.D., *See* Roberto, J.B., 20:7876
Andersson, Inger, *See* Eriksson, Aake, 20:8635
Andersson, Mats, Performance of additives in reducing ammonia emissions from cow slurry, 20:8467 (R;SE)
Andersson, Staffan, About the influence on the heat load from net structure and operating strategy for a DH-network, 20:8054 (RA;SE)
Andre, G., *See* Kuznietz, M., 20:8082, 20:8121, 20:8122
Andrews, J.W., Measurement of thermal regain in duct systems located in partially conditioned buffer spaces. Informal report, 20:7959 (R;US)
Andrews, M.K., *See* Cicero, C.A., 20:7429
Andricevic, R., *See* Pohlmann, K., 20:8650
Andries, J., *See* Nykaenen, J., 20:7141
Anikanov, S.S., Functional design bases for a safety parameter display system for WWER-type reactors, 20:7721 (RA;XA)
Anikina, M.Kh., *See* Avramenko, S.A., 20:8928
Anishchik, V.M., *See* Novikov, A.P., 20:8998
Anisimov, Yu.S., *See* Afanas'ev, S.V., 20:8376
Ankry, N., Radiation Monitor (RAM) I-125, 20:8351 (RA;IL)
Radiation Monitor (RAM) ION communication with wireless monitoring system, 20:8353 (RA;IL)
Radiation Monitor (RAM) ION pressure response instrument, 20:8352 (RA;IL)
See Mazor, T., 20:8355
Ann, Hyun Suk, *See* Kang, Young Ho, 20:8100
Anne, R., *See* Lewitowicz, M., 20:8914
Anosov, A.I., Intelligence operator support system, 20:7725 (RA;XA)
Ansari, S., Development of PC-based FFT system for reactor dynamic analysis, 20:7644 (R;PK)
Antipin, D.V., Calibration of multichannel analyzer of charge-exchange atoms, 20:9060 (R;RU;In Russian)
Anton, M., *See* Lister, J.B., 20:9072
Antonio, E.J., *See* Rathbone, B.A., 20:8396
Antonov, A.N., *See* Gaidarov, M.K., 20:8859
Antsiferov, V.V., Spectroscopic measurements of plasma parameters of planotron and Penning H^- ion source discharges, 20:8685 (R;RU;In Russian)
Anyshchik, V.M., Temperature dependence of microhardness for aluminium implanted with nickel ions, 20:8098 (IA;RU;In Russian)
Anz, S.J., Recipes for high resolution time-of-flight detectors, 20:8176 (R;US)
Apte, P., *See* Suits, B.H., 20:8136
Arad, M., Computerized central control and supervision room, 20:7708 (RA;IL)
Aranyossy, J.F., Development of hydrogeological isotopic techniques in Sahelian countries. General framework and realization of regional project RAF/8/012 (Senegal, Mali, Niger, Cameroon), 20:8478 (RA;XA;In French)
See Fall, M., 20:8451
See Joseph, A., 20:8532, 20:8536
See Ketchemen, B., 20:8484
See Ndiaye, B., 20:8480
See Njitchoua, R., 20:8486
See Sidoro, M., 20:8482
See Tandia, A.A., 20:8479
See Zakara, Z., 20:8483
Ardalan, F., The discovery of t quark, 20:8833 (IA;IR;In English, Persian)
Arellano, J., An expert system for diagnosing failures in the condensate system of the Laguna Verde Nuclear Power Plant, 20:7744 (RA;XA)
See Francois, J.L., 20:7645
Arendt, J.W., Transportation and packaging resource guide, 20:7282 (R;US)
Argos, P., Prediction of protein folding pathways, 20:8554 (RA;US)
See Heringa, J., 20:8557
Armour, J., *See* Kwiatkowski, D.J., 20:8573
Armstrong, R., *See* Markel, V.A., 20:8980
Armstrong, T.R., Alternative materials for solid oxide fuel cells, 20:7922 (RA;US)

Arnecke, G., Theoretical analyses of interactions between core melt and coolant, 20:7803 (RA;DE;In German)
Arnold, W.D. Jr., *See* Coroneos, A.C., 20:7335
Artaud, J.F., Current distributions in superconducting wires subject to a random orientation magnetic field, and corresponding to the Tokamak usual conditions, 20:9033 (R;FR;In French)
Arvin, E., Organic micro-pollutions in ground water resources, cleaning and water usage, 20:8501 (RA;DK;In Danish)
Arzate O, O., Elimination of organics chemicals in aqueous solutions by gamma radiation processing., 20:8205 (IA;MX)
See Moreno A, J., 20:8208
Ashraf, M.M., Review of neutron radiographic applications in industrial and biological systems, 20:7534 (R;PK)
Ashton, F., *See* Fatemi, S.J., 20:8793
Ashwood, T.L., *See* Suter, G.W. II, 20:7473
Aslam, M., *See* Aziz, A., 20:7778
Aslanov, V., *See* Moses, W.W., 20:8392
Aspiazu, J., Efficiency curve determination of Si (Li) detector., 20:8372 (IA;MX)
Assido, H., *See* Ellenbogen, E., 20:8358
See Levinson, S., 20:8363
See Paran, J., 20:8360
See Wengrowicz, U., 20:8359
Assink, R.A., *See* Myers, S.A., 20:8175
Aston, D., Test of a conceptual prototype of the total internal reflection Cherenkov imaging detector (DIRC) with cosmic muons, 20:8401 (R;US)
Atanasov, A.N., *See* Kostov, G.N., 20:8210
Athey, C.L., *See* Johnson, G.R., 20:9184
Atkinson, B., *See* Turiel, I., 20:7982
Attaya, H., Radioactivity computation of steady-state and pulsed fusion reactors operation, 20:9095 (R;US)
See Billone, M.C., 20:9090
Au, G., Covariant phase space formulations of superparticles and supersymmetric WZW models, 20:8744 (R;AU)
Aubert, J.H., *See* Filuk, A.B., 20:9126
See Saunders, R.S., 20:8148
Auger, G., *See* Lewitowicz, M., 20:8914
Auh, J.M., *See* Son, Y.M., 20:8456
Aula, A., *See* Haerkoenen, M., 20:8260
Austin, M.E., *See* Groebner, R.J., 20:9049
Autrey, S.T., *See* Matson, D.W., 20:7231
Avdeev, L.V., A Queer Reduction of Degrees of Freedom, 20:8731 (R;XJ)
Avignone, F.T. III, *See* Barabash, A.S., 20:8870
Avila-Perez, P., Analysis of Pre colombian Mexican golden pieces by X-ray fluorescence spectrometry., 20:8161 (IA;MX)
Avramenko, S.A., Pion Momentum Spectra in Nuclear Charge Exchange Reactions A(t, ^{3} He), 20:8928 (R;XJ)
Axinescu, S., *See* Catana, D., 20:8319, 20:8320
Axler, K.M., *See* West, M.H., 20:7263
Axmann, A., Radiological effects of an aircraft crash into the BER II research reactor. Comparison of effects for HEU and LEU fuels, 20:7785 (R;DE;In German)
Axness, C., Non-Salado flow and transport position paper. Revision 1, 20:7293 (R;US)
Ayazuddin, S.K., Delayed neutron monitoring system for fuel failure detection at PARR-1, 20:7775 (R;PK)
Aydin, A., *See* Pollard, D.D., 20:8649
Azad, H., Ricci-flat Kaehler metrics on symmetric varieties, 20:8718 (R;XA)
Azakov, S., Grand canonical potential of the anyon gas, 20:8701 (IA;IR;In English, Persian)
Aziz, A., Sector emergency procedures for Pakistan Research Reactor-1 (PARR-1) PINSTECH, 20:7778 (R;PK)
Azorin, J., ESR-TRIS system as a gamma dosimeter., 20:8373 (IA;MX)

B

Ba, B., Spectral response of a polycrystalline silicon solar cell, 20:8994 (R;XA)
Baatarkhuu, D., Project of a laboratory for activation analysis on the basis of microtron MPR, 20:8292 (IA;RU;In Russian)
Babaei, A.A., Investigation of the magnetic flux vortices structure in high-temperature superconductors, 20:9037 (IA;IR;In English, Persian)
Screening currents in anyon superconductivity on the torus for two geometries of fixed external magnetic fields, 20:9036 (IA;IR;In English, Persian)
Babich, A.A., Search for new physics indirect effects in $e^+e^- \rightarrow W^+W^-$ at linear colliders with polarized beams, 20:8791 (R;XA)
Babu, P.G., *See* Parikh, J., 20:7897
Bacon, L.D., *See* Filuk, A.B., 20:9126
Bader, S.D., *See* Mattson, J.E., 20:8071
Bae, Ki Kwang, *See* Yang, Myeong Seung, 20:7668
Bae, L.H., *See* Oh, C.S., 20:7976
See Shin, H.S., 20:7977
Baeckblom, G., *See* Olsson, Olle, 20:7359
Baeckstroem, S., Evaluation of the prerequisites to adapt to the law on environmental charges on emission of nitrogen oxides in energy production at combustion plants producing 25-50 GWh/year, 20:7867 (R;SE;In Swedish)
Baek, Sam Tae, *See* Lee, Ji Bok, 20:7774
Baek, Seung Uh, *See* Chung, Heung Seok, 20:7515
Baenziger, U., *See* Schreiber, G.A., 20:8600
Baer, M., Integral and differential cross sections foe the Li+HF->LiF+H process. A comparison between jz quantum mechanical and experimental results, 20:8185 (RA;IL)
See Baram, A., 20:8184
See Gillbert, M., 20:8183
See Last, I., 20:8186
See Ron, S., 20:8661
See Szichman, H., 20:8962
Bahar, J., *See* Stotland, A., 20:8599
Bai, T., Study of the effects of ambient conditions upon the performance of fan powered, infrared, natural gas burners. Quarterly technical progress report, September 1–September 30, 1994, 20:7257 (R;US)
Baig, A.R., *See* Ansari, S., 20:7644
Baik, Dae Hyun, *See* Cha, Hyung Ki, 20:8988
See Lee, Jong Min, 20:7516, 20:8169, 20:8231
Baik, I.H., *See* Son, J.I., 20:8457
Baik, Sung Hun, *See* Kim, Chul Jung, 20:8702
Bailey, J.E., *See* Filuk, A.B., 20:9126
Bailey, K.C., Director's series on proliferation, 20:8068 (R;US)
Baird, J.L., *See* Lujan, R.D., 20:8106
Bajramashvili, I.A., *See* Guldamashvili, A.I., 20:8095
Bak, I.H., *See* Choi, I.S., 20:7971
See Lee, H.K., 20:7970
Bakale, G., Ionization in liquids [annual] progress report, 1993–1994, 20:8200 (R;US)
Ionization in liquids. Progress report, November 1, 1990–October 31, 1993, 20:8199 (R;US)
Baker, B.S., Update: Commercialization of the direct fuel cell, 20:7938 (RA;US)
Baker, C., Parametric design using IGRIP, 20:7353 (R;US)
Balabanov, N.P., *See* Belov, A.G., 20:8289, 20:8923
See Gangrskij, Yu.P., 20:8922
See Kondev, F.G., 20:8917
Balachandran, U., Practical superconductor development for electrical power applications, annual report for FY 1994, 20:8268 (R;US)
See Krishnaraj, P., 20:8114
See Warrier, K.G.K., 20:8116
Baldwin, D.L., Comparative study of Total Organic Carbon (TOC) methods for high-level mixed waste, 20:7346 (R;US)
Baldwin, R.E., Experience gained in the lightning protection of aircraft and petrochemical installations applicable to wind turbine generators, 20:8239 (RA;DK)
Bale, A.E., *See* Kwiatkowski, D.J., 20:8573
Ball, E.E., HFC 356, a zero ODP blowing agent candidate for North American appliance foam formulations, 20:8033 (RA;US)
Ballarin, F., *See* Garbagnati, E., 20:7618
Bandyopadhyay, K., *See* Veletsos, A.S., 20:8225
Bang, Hong Sik, *See* Kim, Jae Rok, 20:7519
Bangerter, R.O., *See* Lee, E., 20:9123

Bao Shanglian, *See* Tang Guoyou, 20:8885
Bar-Shalom, A., *See* Levron, D., 20:8954
Barabash, A.S., Two neutrino double-beta decay of ^{100}Mo to the first excited 0$^+$ state in ^{100}Ru, 20:8870 (R;US)
Barak, D., *See* Boneh, R., 20:8365
Barak, J., Study of a single-event-upset in PAL16R8, 20:8406 (RA;IL)
See Ilberg, D., 20:8408
Baram, A., Quantum mechanical cross sections for D+H_2 and H+D_2 reactive systems. Application of the negative imagnibnary potentials within the j_Z approximation, 20:8184 (RA;IL)
See Gillbert, M., 20:8183
See Last, I., 20:8186
Baran, A., Industrial x-ray computed tomography, 20:8588 (RA;IL)
Barger, P.T., Development of a catalyst for conversion of syngas-derived materials to isobutylene. Quarterly report number 11, October 1–December 31, 1993, 20:7563 (R;US)
Barinaga, C.J., *See* Farmer, O.T. III, 20:7352
Bark, Rae Joon, *See* Yoo, Kun-Joong, 20:7665
Barker, C.E., Temperature-insensitive phase-matched optical harmonic conversion crystal, 20:8273 (PA;US)
Barletta, W., *See* Foerster, C.L., 20:8333
Barnea, Z., *See* Grigg, M.W., 20:8331
Barnes, A.B., *See* Duignan, M.R., 20:7439
Barnes, D., Collaborations in fusion research, 20:9125 (R;US)
Barnett, D.B., *See* Johnson, V.G., 20:7455
Baron, L.A., *See* Holt, V.L., 20:7481, 20:7482
Baron, R.E., *See* Cunningham, R.E., 20:7242
Barrington, C.A., Evaporation analysis for Tank SX-104, 20:7399 (R;US)
Bartels, D.M., Time-resolved EPR studies of the H atom: A stable heavy isotope of muonium, 20:8196 (R;US)
Bartholomew, C.H., *See* Martino, A., 20:8194
Bashir, J., *See* Butt, N.M., 20:7779
Baskett, R.L., The challenge of emergency response dispersion models on the meso-gamma urban scale: A case study of the July 26, 1993 Oleum tank car spill in Richmond, California, 20:8645 (R;US)
Basore, P.A., Crystalline-silicon photovoltaics: Necessary and sufficient, 20:7589 (R;US)
See Cuevas, A., 20:7590
Bassalleck, B., *See* Rusek, A., 20:8879
Bassir, A., Ferromagnetic Potts model in a magnetic field: Finite lattice extrapolation of the (1+1)-dimensional Hamiltonian, 20:9022 (R;XA)
Bateman, V.I., Crushable structure performance determined from reconstructed dynamic forces during impact tests, 20:8424 (R;US)
Bates, J.K., *See* Buck, E.C., 20:7441
Batey, J., *See* Butcher, T.A., 20:7951
Batey, J.E., Oil heat technology - efficiency training manual, 20:7948 (RA;US)
Batha, S., *See* LeBlanc, B., 20:9076
Baum, J.W., *See* Khan, T.A., 20:7291
Baumann, P., *See* Schreiber, G.A., 20:8600
Baumgartner, W.V., *See* Endres, A.W., 20:8397
Baxter, L., Baseline NO_x emissions during combustion of wood-derived pyrolysis oils, 20:7560 (R;US)
Bay, H., Problems concerning the accumulation of isolated plutonium - The Swiss situation, 20:7273 (RA;XA)
Bayless, W.R., *See* Schirber, J.E., 20:8147
Baylor, L.C., *See* Wicks, G.G., 20:8172
Beach, R.J., Lensing duct, 20:8414 (PA;US)
Beard, L.P., *See* Doll, W.E., 20:7445
Beary, M.M., K Basin spent fuel sludge treatment alternatives study. Volume 1, Regulatory options, 20:7343 (R;US)
K Basin spent fuel sludge treatment alternatives study. Volume 2, Technical options, 20:7344 (R;US)
Beauheim, R., *See* Axness, C., 20:7293
Beazley, D.M., A practical approach to portability and performance problems on massively parallel supercomputers, 20:9177 (R;US)
Becerril, A., Application of the species existence-predominance and distribution diagrams to the plutonium and americium electrodeposition., 20:8215 (IA;MX)
Becker, D.L., Accelerated safety analyses - structural analyses Phase I - structural sensitivity evaluation of single- and double-shell waste storage tanks, 20:7407 (R;US)
Becker, N.M., *See* Ferenbaugh, R.W., 20:7477
Beckman, M.C., *See* Khan, T.A., 20:7291
Beddies, H., Water-blown rigid urethane foam for thermal insulation, 20:8036 (RA;US)
Bedimo, J.P., *See* Fofana, A., 20:8533
Beer, M.A., Field-aligned coordinates for nonlinear simulations of tokamak turbulence, 20:9085 (R;US)
Beeri, O., *See* Dayan, D., 20:8087
Beets, A.L., *See* Knapp, F.F. Jr., 20:8218
Behl, Y., *See* Axness, C., 20:7293
Behling, R.D., *See* Ohlrogge, K., 20:7244
Behnke, M.R., A methodology for the evaluation of lightning protection measures for wind turbine generating stations, 20:7626 (RA;DK)
Behrendt, H., Completing a plant to simulate the plasma/wall interaction in a fusion reactor. Final report, 20:9103 (R;DE;In German)
Behrndt, K., Creation of a scalar potential in 2D dilaton gravity, 20:8737 (R;US)
Quantum corrections for a cosmological string solution, 20:8735 (R;US)
Bekmirzaev, R.N., Rapidity Distributions of Protons in (p, d, α, C)C-Interactions at 4.2 GeV/c per Nucleon, 20:8933 (R;XJ;In Russian)
Belaga, V.V., Coherent Dissociation $^{12}C \rightarrow 3\alpha$ in Emulsion Enriched by Pb, 20:8935 (R;XJ;In Russian)
Bell, J.B., *See* Pember, R.B., 20:8220
Bell, K.E., 45-Day safety screening for Tank 241-C-103 push mode sample, riser 2, 20:7500 (R;US)
Tank 241-SY-103 auger samples, risers 7A, 14B and 22A, 20:7397 (R;US)
Bell, R., *See* LeBlanc, B., 20:9076
See Ono, M., 20:9086
Bell, R.E., *See* Bush, C.E., 20:9079
See Talvard, M., 20:9083
Bellas, H.W., 100 Areas weekly report, June 9, 1955, 20:7705 (R;US)
Bellingen, E.M., Polymer membranes for methane gas treatment, 20:7546 (R;DE;In German)
Belov, A.G., Microtron MT-25 and its areas of use, 20:8291 (IA;RU)
Microtron MT-25. (Electromagmet design, operating experience), 20:8290 (IA;RU;In Russian)
Photoactivation of isomer ^{137}Ce in the region of giant dipole resonance, 20:8923 (IA;RU)
Present status on organization of nuclear-physical laboratory 'MICROTRON' in Plovdiv University, 20:8289 (IA;RU;In Russian)
See Baatarkhuu, D., 20:8292
See Ivanov, V.G., 20:8321
See Kondev, F.G., 20:8920
See Maslov, O.D., 20:8167
Beltratti, A., Environmental problems and attitudes towards risk and uncertainty, 20:7896 (RA;CH)
Belykh, T.A., *See* Prilepo, V.L., 20:8090
See Urmanov, A.R., 20:8999
Ben-Haim, M., Application of artificial neural networks for modeling localized corrosion, 20:8229 (RA;XA)
Ben-Shachar, B., *See* Horowitz, Y.S., 20:8350
Ben-Slimane, R., *See* Hepworth, M.T., 20:7105
Ben-Zvi, I., *See* Qiu, Xu Z., 20:8299
Benedek, K., Cross-flow, filter-sorbent-catalyst for particulate, SO_2 and NO_x control. Final report, 20:7171 (R;US)
Benett, W.J., *See* Beach, R.J., 20:8414
Benjaza, A.A., *See* Belaga, V.V., 20:8935
Benker, D.E., *See* Brunson, R.R., 20:7334
Benkirane, A., 1-D and 2-D processing for on-line control and data analysis assistance for the multidetector 4π INDRA, 20:8349 (R;FR;In French)
Bennert, D.M., *See* Cicero, C.A., 20:7429
Beno, M.A., *See* Knapp, G.S., 20:8309
Bentley, C.R., *See* Baker, B.S., 20:7938
Benyoussef, A., *See* Bassir, A., 20:9022
Benz, G., Modeling and assessment of accident consequences; development of RODOS, a real-time on-line decision support system for nuclear emergencies in Europe, 20:7816 (RA;DE;In German)
Beon, Myeong Uh, *See* Kim, Jae Rok, 20:8602

Beranr, Z., *See* Wolf, A., 20:8856
Berdoz, A., *See* Rusek, A., 20:8879
Berezhiani, V.I., Resonant re-formation of the vacuum, 20:8722 (R;XA)
Bergdahl, B.G., FASMON monitoring of space dependent oscillations in a BWR, 20:7706 (R;SE)
Berge, L., *See* Alexander, N., 20:8941
Berger, D.J., Advanced direct coal liquefaction concepts. Executive summary, Volume 1, 20:7125 (R;US)
Advanced direct coal liquefaction concepts. Quarterly report, April 1–June 30, 1994, 20:7127 (R;US)
Bergles, A.E., *See* Trewin, R.R., 20:8022
Bergmann, B., The outlook for natural gas in Germany, 20:7250 (R;NO)
Bergsman, T.M., *See* Gauglitz, P.A., 20:7486
Bergstrom, K.A., Geophysical investigation of 216-U-8 clay vitrified pipe transfer line, 200 West Area, 20:7456 (R;US)
Berkowitz, J., Some thoughts of future experiments with the new generation of storage rings, 20:8965 (R;US)
Berman, M., Prosperity Game: Advanced Manufacturing Day, May 17, 1994, 20:7847 (R;US)
Bern, Z., Recent progress in one-loop multi-parton calculations, 20:8769 (R;US)
Bernabei, S., *See* Ono, M., 20:9086
See Talvard, M., 20:9083
Bernard, C., Update on B_K with Wilson fermions, 20:8711 (R;US)
Bernard, R., Carbonate fuel cell analysis, 20:7926 (RA;US)
Status of 120-kW direct fuel cell product improvement and testing, 20:7943 (RA;US)
Bernem, K.H. van, Inventory and sensitivity mapping in the German Wadden Sea. June 1987 - June 1993. Final report, 20:8530 (R;DE;In German)
Berner, A., *See* Lind, T., 20:7140
Berry, D.L., *See* Bitz, D.A., 20:7364
Berry, H.G., *See* Ali, R., 20:8958
Berry, L., Progress in the standardization of DSM terminology, reporting formats, and evaluation protocols, 20:7912 (R;US)
Bertolotti, G., *See* Drain, F., 20:7279
Berven, B.A., *See* Roberto, J.B., 20:7876
Beshtoev, Kh.M., Dynamical Analogy of Cabibbo-Kobayashi-Maskawa Matrices, 20:8732 (R;XJ)
Renormcharges in V-A Theories, 20:8798 (R;XJ)
Betts, R.R., Twenty five years of clusters – from Bochum to Strasbourg, 20:8845 (R;US)
Beyer, G., *See* Yushkevich, Yu.V., 20:8324
Bhanot, G., *See* Glaessner, U., 20:8712
Bhaumick, D., *See* Bhown, A.S., 20:7635
Bhown, A.S., Advanced separation technology for flue gas cleanup. Quarterly technical report No. 10, 20:7635 (R;US)
Bibi, S., *See* Mashiatullah, A., 20:8545
Bibler, N.E., *See* Crawford, C.L., 20:7430
Bickford, D.F., *See* Cicero, C.A., 20:7429
See Whitehouse, J.C., 20:7432
Bickford, W.E., Department of Energy Plutonium ES&H Vulnerability Assessment Savannah River Site interim compensatory measuros, 20:7286 (R;US)
Bielajew, A.F., *See* Nelson, W.R., 20:8950
Bilal, R., *See* Sajjad, M.I., 20:8174
Billone, M.C., Beryllium in the ITER blanket, 20:9092 (R;US)
Modeling of tritium recovery from lithium ceramics, 20:8212 (R;US)
Optimization of beryllium for fusion blanket applications, 20:9091 (R;US)
Status of the solid breeder materials database, 20:7674 (R;US)
Validation of tritium transport models for Li_2O, 20:9090 (R;US)
See Raffray, A.R., 20:7675
Biskamp, D., Nonlinear instability mechanism in 3-D collisional drift-wave turbulence, 20:9054 (R;DE)
Bitter, M., *See* Hill, K.W., 20:9082
Bitz, D.A., Decision and systems analysis for underground storage tank waste retrieval systems and tank waste remediation system, 20:7364 (R;US)
Bizarro, J.P., Study of the dynamics of the lower hybrid wave during current drive in tokamaks and of the Weyl-Wigner in quantum mechanics, 20:9047 (R;FR;In French)
Bjoerklund, N.K., Surface contraction and expansion waves correlated with differentiation in axolotl embryos. III. The shape of the fate map, 20:8571 (RA;US)
Blackaby, W.B., Purex canyon exhaust fan bearing temperature monitoring system doric 245 datalogger programming, 20:7408 (R;US)
Blake, D.M., Solar photochemistry - twenty years of progress, what's been accomplished, and where does it lead?, 20:7585 (R;US)
Blanch, H.W., *See* Scott, C.D., 20:7570
Blaschke, D., Instantaneous Chiral Quark Model for Relativistic Mesons in a Hot and Dense Medium, 20:8835 (R;XJ)
Blatter, J., High-temperature superconductivity in Switzerland. Perspectives to the year 2000, 20:9032 (I;CH;In German)
Blazek, K., *See* Adam, J., 20:8384, 20:8385
Blazhevich, S.V., *See* Maslov, N.I., 20:9007
Bleil, C.E., Float zone silicon sheet growth. Quarterly technical progress report No. 5, October 1, 1994–December 31, 1994, 20:8141 (R;US)
Blessing, S.K., Search for supersymmetric $\tilde{W}_1$ and $\tilde{Z}_2$ states using the D0 detector, 20:8788 (R;US)
Blidung, T., Simulation and stability testing of the fuzzy control of an implant welding unit, 20:8079 (R;DE;In German)
Bliss, M., Real-time dosimetry for boron-neutron capture therapy, 20:8593 (R;US)
Blodgett, D.W., *See* VanKuiken, J.C., 20:7904
Bloom, E., Materials development for DEMO and commercial fusion reactors, 20:9112 (IA;DE)
Bloom, I., *See* Krumpelt, M., 20:7930
Bloom, I.D., *See* Krumpelt, M., 20:7925, 20:7927, 20:7928
Bloomquist, D.D., *See* Filuk, A.B., 20:9126
Bloomsburg, M.S., 300-M Area weekly report, November 4–10, 1955, Savannah River Plant, 20:7767 (R;US)
Blottner, F.G., *See* Wong, C.C., 20:8255, 20:8256
Blout, D.O., Geohydrologic data collected from shallow neutron-access boreholes and resultant-preliminary geohydrologic evaluations, Yucca Mountain area, Nye County, Nevada, 20:7366 (R;US)
Blythe, G., High SO_2 removal efficiency testing. Quarterly status report, April–June, 1994, 20:7634 (R;US)
Bobrovich, O.G., *See* Tashlykov, I.S., 20:8093
Bochek, G.L., *See* Maslov, N.I., 20:9007
Bochniak, D., *See* Subramaniam, B., 20:7567
Boecker, D., The future of brown coal mining in Germany. Lectures, 20:7187 (I;DE;In German)
Boegl, K.W., *See* Schreiber, G.A., 20:8601
Boehm, L., *See* Liepmann, M.J., 20:8402
Boehnert, R., *See* Axmann, A., 20:7785
Boettinger, W.L., The stainless steel beneficial reuse integrated demonstration, 20:7428 (R;US)
Bogatyrev, I.L., Constant system for by-channel thermal-hydraulic calculation of fuel assembly operational conditions in reactors with natural and mixed convection, 20:7700 (R;RU;In Russian)
Bogdany, J., Technology and applications, 20:9173 (R;HU)
Bogen, G.J., 241-BY-106 sampling test plan, 20:7420 (R;US)
Boger, Z., The status of application of neural networks in the nuclear industry, 20:7741 (RA;XA)
See Keter, A., 20:7745
Boghosian, S., *See* Turiel, I., 20:7982
Bogoslovskaya, G.P., *See* Bogatyrev, I.L., 20:7700
Bohmeyer, W., *See* Behrendt, H., 20:9103
Bojko, E.B., High intensity ion implantation: method of nitride phase formation, 20:8089 (IA;RU;In Russian)
Study of SiO_2-Si structure implanted by antimony ions, 20:9001 (IA;RU;In Russian)
Bojko, I.R., Scintillator Based on SiO_2-Aerogel, 20:8386 (R;XJ;In Russian)
Bolotov, V.V., *See* Ehmeksuzyan, V.M., 20:8094
Boltenko, Eh.A., Technique for calculating temperature conditions for fuel elements with bilateral heat removal taking into account axial heat fluxes, 20:7699 (R;RU;In Russian)
Bolton, R.D., Radon monitoring using long-range alpha detector-based technology, 20:8459 (R;US)
Bonato, P.S., *See* Carvalhinho, C.C.L., 20:8163
Bond, J.A., *See* Van Der Beck, R.R., 20:7680

Bond, W.D., *See* Brunson, R.R., 20:7334
Bondeson, A., *See* Ward, D.J., 20:9074
Boneh, R., Digital stabilizer for multichannel analysis, 20:8365 (RA;IL)
Bonifacio M, G., Sorption of radioactive cobalt with sepiolite and erionite., 20:8217 (I;MX;In Spanish)
Bonus, H., Theory and practice of internalisation of external costs, 20:7842 (IA;CH;In German)
Boo, J.H., *See* Lim, S.H., 20:7972
Bookless, W.A., Energy and Technology Review. 20:9129 (R;US)
Bool, L.E., *See* Helble, J.J., 20:7175
Borba, D., *See* Fasoli, A., 20:9073
Borgeson, M.E., Project management plan, Hazardous Materials Management and Emergency Response Training Center, 20:7498 (R;US)
Borisov, A.M., *See* Romanovskij, E.A., 20:8986
Borodovsky, M., Deriving non-homogeneous Markov chain models from the multiple alignment with the entropy criteria, 20:8574 (RA;US)
Bosch, P., *See* Carrera, L.M., 20:8187
See Munoz, G.B., 20:8216
Bostick, D.A., *See* Coroneos, A.C., 20:7335
Boucau, J., The SPDS as a tool to improve post-accident strategy on WWER and RBMK reactors, 20:7719 (RA;XA)
See Richelle, G., 20:7710
Boucher, M.S., Water levels in wells J-11 and J-12, 1989-91, Yucca Mountain Area, Nevada, 20:7454 (R;US)
Boujrhal, F.M., Study of radon-222 emanation from sedimentary phosphates and corresponding phosphogypsum. Temperature effect, 20:8491 (I;MA;In French)
Bourcier, W.L., *See* Bruton, C.J., 20:7365
Bouree, F., *See* Kuznietz, M., 20:8081, 20:8082, 20:8121, 20:8122
Bourn, G., Development of a dedicated ethanol ultra-low emission vehicle (ULEV) system design, 20:8064 (R;US)
Bowen, S.M., *See* Marsh, S.F., 20:7478
See Svitra, Z.V., 20:7323
Bowman, J.C., A wavenumber-partitioning scheme for two-dimensional statistical closures, 20:8973 (R;US)
On inertial range scaling laws, 20:8974 (R;US)
Bowman, L.E., Raman spectroscopic studies in supercritical water, 20:8055 (R;US)
Boyack, B.E., CONTAIN independent peer review, 20:7817 (R;US)
Boyes, J., *See* Filuk, A.B., 20:9126
Boysen, J., Evaluation of the freeze-thaw/evaporation process for the treatment of produced waters. Quarterly technical progress report, July 1, 1994–September 30, 1994, 20:7240 (R;US)
Braby, L.A., *See* Casarett, G.W., 20:8627
Brackenbush, L.W., *See* Endres, A.W., 20:8397
Brady, P.V., *See* Lindgren, E.R., 20:7488
Bragin, S.I., *See* Smirnov, L.S., 20:9009
Bramryd, T., *See* Nilsson, Peter, 20:7562
Brand, D., *See* Ilberg, D., 20:8408
Brandes, S.D., *See* Robbins, G.A., 20:7138
Brandt, J.E., *See* Warren, J.L., 20:8243
Brankowski, J., *See* Smirnov, L.S., 20:9009
Brannon, E., Movements of white sturgeon in Lake Roosevelt. Final report, 1988–1991, 20:7578 (R;US)
Brannon, P.J., Transient radiation-induced absorption in materials for the DOI laser, 20:8278 (R;US)
Bratkovskaya, E.L., Spin Momentum Correlation (Handedness) in the Process of Four Pion Production in the Electron-Positron Collisions, 20:8801 (R;XJ)
Bray, L.A., Web technology in the separation of strontium and cesium from INEL-ICPP radioactive acid waste (WM-185), 20:7342 (R;US)
Braye, S., Pollution prevention opportunity assessment for the SNL/California waste management facilities, 20:7357 (R;US)
Breltung, W., Studies of distribution and combustion of hydrogen in PWR type plants, 20:7794 (RA;DE;In German)
Studies of hydrogen distribution and combustion in PWR plants, 20:7799 (RA;DE;In German)
Brenner, D.S., *See* Wolf, A., 20:8855, 20:8856
Brentano, P. von, *See* Sokolov, V.V., 20:8847
Breskin, B., *See* Giberkhteerman, A., 20:8993
Bresnaham, P.J., Integration of heterogeneous data bases for development of a large-scale environmental data atlas for multi-platform PC and workstation users, 20:7503 (R;US)
Bretonne, R. de la, *See* Felmy, A.R., 20:7348
Bretscher, M.M., Relative performance properties of the ORNL Advanced Neutron Source Reactor with reduced enrichment fuels, 20:7763 (R;US)
Brevick, C.H., Historical Tank Content Estimate for the Northwest Quandrant of the Hanford 200 East Area, 20:7400 (R;US)
Historical Tank Content Estimate for the Southwest Quandrant of the Hanford 200 West Area, 20:7401 (R;US)
Briancon, Ch., *See* Mikhajlov, I.N., 20:8864
Britt, T.E., *See* Shapiro, B.J., 20:7505
Britten, I.N., HM nuclear installation inspectorate's experience of the regulatory control of the storage, handling and transport of civil plutonium in the United Kingdom, 20:7513 (RA;XA)
Brockhoff, R.C., *See* Court, J.D., 20:8949
Brockmann, R., *See* Schreiber, G.A., 20:8600
Brodzinski, R.L., *See* Barabash, A.S., 20:8870
Broerse, J.J., *See* Casarett, G.W., 20:8627
Broniowski, W., *See* Cohen, T.D., 20:8853
Brooks, K.G., Orientation of rapid thermally annealed lead zirconate titanate thin films on (111) Pt substrate, 20:8135 (R;AU)
See Bursill, L.A., 20:8133
Brown, G.N., *See* Bray, L.A., 20:7342
Brown, M.J., 200 Area TEDF interface control document, 20:7383 (R;US)
Brown, T.D., *See* Whitehead, D.W., 20:7650
Broz, R.E., T Plant hazards assessment, 20:7495 (R;US)
Bruggen, M., Landau-Zener treatments of solar neutrino oscillations, 20:8688 (R;US)
Brugman, B., *See* Wehner, S., 20:7224
Brumby, S.P., Multi-particle correlations in quaternionic quantum systems, 20:8707 (R;AU)
Quantum dynamics in regions of quaternionic curvature, 20:8746 (R;AU)
Brummerstedt Iversen, S., Membrane contactors to replace conventional scrubbers, 20:7638 (R;DK)
Brunson, R.R., Removal of cesium from aluminum decladding wastes generated in irradiated target processing using a fixed-bed column of resorcinol-formaldehyde resin, 20:7334 (R;US)
Bruton, C.J., Field-based tests of geochemical modeling codes using New Zealand hydrothermal systems, 20:7365 (R;US)
Bryan, R.P., Visible light emitting vertical cavity surface emitting lasers, 20:8272 (PA;US)
Bryant, J.B., The photosynthetic acclimation of Lolium perenne growing in a free-air CO_2 enrichment (FACE) system, 20:8585 (R;US)
Buchel'nikova, N.S., Bernstein-Green-Kruskal wave, 20:9056 (R;RU;In Russian)
Bernstein-Green-Kruskal wave. 2. The interaction with the Langmuir wave. Stochastic phenomena, 20:9057 (R;RU;In Russian)
Conversion of the Bernstein-Green-Kruskal wave on the density perturbation. Part 1, 20:9061 (R;RU;In Russian)
Conversion of the Bernstein-Green-Kruskal wave on the density perturbation. Part 2, 20:9062 (R;RU;In Russian)
Conversion of the Bernstein-Green-Kruskal wave on the density perturbation. Part 3, 20:9063 (R;RU;In Russian)
Conversion of the Bernstein-Green-Kruskal wave on the density perturbation. Part 4, 20:9064 (R;RU;In Russian)
Buchholtz, H.V., *See* Schreiber, G.A., 20:8601
Buck, E.C., Uranium-contaminated soils: Ultramicrotomy and electron beam analysis, 20:7441 (R;US)
Buckley, J.S., Integration of advanced geoscience and engineering techniques to quantify inter-well heterogeneity. Quarterly technical report, July 1, 1994–September 30, 1994, 20:7191 (R;US)
Buckley, L.P., Soil treatment to remove uranium and related mixed radioactive heavy metal contaminants. Seventh quarterly technical progress report, July 1, 1994–September 30, 1994, 20:8470 (R;US)
Budd, H.S., W-charge asymmetry at CDF, tests of structure functions, 20:8827 (R;US)
Budhani, R.C., *See* Welch, D.O., 20:8119
Budnik, A.P., Study on space-time evolution of plasma of heavy charged particle track in noble gases, 20:8961 (R;RU;In Russian)

Budny, R., *See* Cheng, C.Z., 20:9081
Buerger, L., *See* Adorjan, F., 20:7713
Buerger, T., *See* Rusek, A., 20:8879
Buhl, M.L. Jr., GPP user's guide - a general-purpose postprocessor for wind turbine data analysis, 20:7622 (R;US)
Buhl, T.E., *See* Ferenbaugh, R.W., 20:7477
Buklanov, G.V., *See* Belov, A.G., 20:8291
See Kuznetsov, I.V., 20:8915
Bukur, D.B., *See* Akgerman, A., 20:8182
Bulbulian, S., *See* Carrera, L.M., 20:8187
See Munoz, G.B., 20:8216
Burbank, D.A., 183-H basin sludge treatability testing program plan, 20:7384 (R;US)
Burchell, T.D., *See* Varacalle, D.J. Jr., 20:8129
Burger, M., *See* Rusek, A., 20:8879
Burichenko, A.P., Vacuum polarization correction to the positronium decay rate, 20:8966 (R;RU)
Burke, F.P., *See* Robbins, G.A., 20:7138
Burrell, K.H., *See* Groebner, R.J., 20:9049
See Hahm, T.S., 20:9087
See Luce, T.C., 20:9048
Burrows, P.N., Measurement of the charged multiplicity of $Z^0 \rightarrow b\bar{b}$ events, 20:8811 (R;US)
Burshtein, Z., *See* Levron, D., 20:8954
Bursill, L.A., Crystallization of sol-gel derived lead zirconate titanate thin films in argon and oxygen atmospheres, 20:8133 (R;AU)
See Brooks, K.G., 20:8135
See Kasukabe, Y., 20:8151
Burstein, O., BANKET - communication network for radiation monitoring devices, 20:8357 (RA;IL)
Burton, R.G., Wear resistant composite structure of vitreous carbon containing convoluted fibers, 20:8137 (R;US)
Burtscher, H., Characterization of soot particles by in situ measurement with different aerosol analysis tools, 20:8477 (RA;FI)
Bush, C.E., Initial H-mode experiments in DT plasmas on TFTR, 20:9079 (R;US)
Bussell, J.H., National standard and code compliance for electrical equipment installed in hazardous locations for the void fraction instrument, 20:7396 (R;US)
Butcher, T.A., Nitrogen oxides (NO_x) and oil burners, 20:7951 (RA;US)
The fan atomized burner - status and application testing, 20:7952 (RA;US)
Butler, R.D., *See* Weinberg, A., 20:7151
Butorin, S.L., Complex probabilistic estimation of seismic resistance of nuclear power plants, 20:8495 (R;RU;In Russian)
Butt, N.M., Contributions of research Reactors in science and technology, 20:7779 (R;PK)
Butterfield, C.P., *See* Muljadi, E., 20:7613
Butts, M.B., Experimental investigation of the migration of the miscible and immiscible components following a light oil spill, 20:8506 (RA;DK)
Byczuk, K., Electronic structure and pairing of strongly correlated fermions: Fermi liquid versus spin liquid, 20:9029 (R;US)
Byeon, Meong Uh, *See* Cho, Han Ok, 20:8604
Byeon, Myeong Uh, The application of irradiation techniques for food preservation and process improvement -Studies on application of radiation and radioisotopes-, 20:8605 (R;KR;In Korean)
Byeon, Taek Sang, *See* Choi, Chang Beom, 20:7671
See Seok, Ho Cheon, 20:7669
Bystrov, V.A., *See* Yushkevich, Yu.V., 20:8324
Byun, Thak Sang, *See* Hong, Jun Hwa, 20:8099

C

Cabral-Prieto, A., *See* Jimenez-Dominguez, H., 20:8984
Cadene, M., *See* Youm, I., 20:8977
Cahill, P.A., *See* Jacobs, S.J., 20:8193
Cai Chonghai, CFUP1- a program for calculating neutron or charged particle induced reactions on fissile nuclei in energy range up to 35 MeV, 20:9156 (RA;CN)
CMUP2- a program for calculating neutron or charged particle induced reactions in energy range up to 50 MeV, 20:9155 (RA;CN)
See Cai Dunjiu, 20:8892
See Liang qichang, 20:8891
Cai Dunjiu, Evaluation of neutron nuclear data for ^{240}Pu, 20:8892 (RA;CN)
See Liang qichang, 20:8891
See Tang Guoyou, 20:8904
See Yu Baosheng, 20:8903
Calderon, M., *See* Foerster, C.L., 20:8333
Caley, S.M., *See* Gauglitz, P.A., 20:7486
Callahan, T., *See* Bourn, G., 20:8064
Calley, M.B., Hazards assessment for the Waste Experimental Reduction Facility, 20:7312 (R;US)
Camaioni, D.M., *See* Matson, D.W., 20:7231
Camassa, R., *See* Alder, M.S., 20:9178
Camp, A.L., *See* Dingman, S.E., 20:7649
Campbell, J.H., Advanced Neutron Source (ANS) Project progress report, FY 1994, 20:7533 (R;US)
Campbell, K.R., *See* Levine, D.A., 20:7483
Campbell, M.J., *See* Tuson, G.B., 20:8023
Canck, H. de, Some safety aspects related to MOX fuel fabrication in Belgium, 20:7703 (RA;XA)
Canfi, A., *See* Freud, A., 20:8213
Canfield, S., *See* Stoughton, R.S., 20:8244
Cannon, T.W., Broadband radiometer, 20:8413 (PA;US)
Canton, L., *See* Dortmans, P.J., 20:8745
Cantoni, P., Experimental Study of Particle Separation in a L Kr Ionization Chamber by Multiple Measuring of dE/d x Using the Shape Analysis of Signal, 20:8377 (R;XJ)
Cao Wentian, *See* Tang Guoyou, 20:8885
Caps, R., Development of evacuated panel thermal insulations, 20:7990 (RA;US)
Carabetta, R.A., Method of and system for producing electrical power, 20:7259 (PA;US)
Carbo, J.R., *See* Gonzalez, J.A., 20:8697
Carlisle, N., Renewable Energy Demonstration Project by the National Renewable Energy Laboratory and the General Services Administration, 20:7586 (R;US)
Carlson, C.D., *See* Hollenberg, G.W., 20:7347
Carmichael, R.W., *See* Keefe, M.L., 20:7576
Carpenter, B.C., Tank 241-TX-105 tank characterization plan, 20:7419 (R;US)
Carpenter, K.E., Work plan for upgrading the 241-A-701 compressed air system and motor control center. Revision 1, 20:7423 (R;US)
Carr, M., Plutonium transport: The UK experience - 35 years on, 20:7281 (RA;XA)
Carr, R.W., *See* Tonkovich, A.L.Y., 20:7571
Carrera, J., *See* Richelle, G., 20:7710
Carrera, L.M., Crystallite size distribution in the synthesis of γ - $LiAlO_2$, 20:8187 (IA;MX)
Carter, C.D., *See* Paul, P.H., 20:8963
Carty, R.H., *See* Doane, E.P., 20:7103
Carvalhinho, C.C.L., Comparison of radiochemical and spectrophotometric detection methods for HPLC-separated Cr(III) hydrolytic species., 20:8163 (IA;MX)
Casarett, G.W., Biological effectiveness of neutrons: Research needs, 20:8627 (R;US)
Casas, I., *See* Grambow, B., 20:8126
Cassem, B.R., *See* Richterich, L.R., 20:7490
Casten, R.F., *See* Wolf, A., 20:8855, 20:8857
Casti, J.L., The limits to reason what science can know about everyday events, 20:8550 (RA;US)
Catana, D., Microtron as an injector into an electron synchrotron, 20:8319 (IA;RU)
The 17-orbit microtron from the Institute of Atomic Physics, Bucharest, 20:8320 (IA;RU)
Catanese, F., Generalized Kummer surfaces and differentiable invariants of Noether-Horikawa surfaces 1, 20:8677 (R;XA)
Cavin, W.S., Tank 41H bounding uranium enrichment. Revision 1, 20:7506 (R;US)
Cekic, M., *See* Sarff, J.S., 20:9044
Celata, C., *See* Lee, E., 20:9123
Celebi, Y., *See* Butcher, T.A., 20:7952
Celi, O., Evaluation of the damages caused by lightning current flowing through bearings, 20:7625 (RA;DK)

Celotta, R.J., Electron-atom collision studies using optically state selected beams. Progress report, May 15, 1987–May 14, 1988, 20:8959 (R;US)
Electron-atom collision studies using optically state selected beams. Progress report, May 15, 1988–May 14, 1991, 20:8960 (R;US)
Cerveny, B., *See* Gillham, T., 20:7219
Cha, Byeong Heon, *See* Lee, Jong Min, 20:8293
Cha, Byung Heon, *See* Kim, Chul Jung, 20:8702
See Lee, Jong Min, 20:7516, 20:8169
Cha, Byung Hun, *See* Lee, Jong Min, 20:8231
Cha, Heung Ryeol, *See* Park, Hyeon Soo, 20:7510
Cha, Hong Ryul, *See* Hong, Jong Sook, 20:7509
Cha, Hyeong Ki, *See* Lee, Jong Min, 20:8293
Cha, Hyung Ki, Development of ultrasensitive spectroscopic analysis technology -Development of atomic spectroscopy technology-, 20:8988 (R;KR;In Korean)
See Lee, Jong Min, 20:7516, 20:8169, 20:8231
Cha, Jong Hee, Thermal-hydraulic characteristics of safety systems in advanced reactors Part 1. Heat transfer in passive containment cooling system. Part 2. Fluid mixing with safety injection, 20:7690 (R;KR;In Korean)
Cha, Kyeong Ho, *See* Sim, Bong Shick, 20:7750
Cha, Kyoung Ho, *See* Kim, Jae Hui, 20:7748
Cha, Y.S., *See* Niemann, R.C., 20:7826
Chacon, M., *See* Gonzalez, J.A., 20:8697
Chae, Jong Seo, A study on the proton beam energy measurement and diagnosis, 20:8325 (R;KR;In Korean)
Chakir, E., Simulation of pressurized water reactor in accidental state., 20:7654 (I;MA;In French)
Chakravarti, S., *See* Datta, A., 20:8831
Chamberlain, D.B., *See* Leonard, R.A., 20:7289
Chamness, M.A., *See* Thorne, P.D., 20:8512
Chan, P., *See* Turiel, I., 20:7982
Chanana, A., *See* Alessi, J.G., 20:8283
Chander, S., *See* Mitchell, G., 20:7148
Chandler, G.A., *See* Filuk, A.B., 20:9126
Chang Chaohsi, On hadronic production of the B_c meson, 20:8790 (R;XA)
Chang, Byeong Hoon, *See* Chang, Won Pyo, 20:7664
Chang, D., *See* Clauss, L., 20:7475
Chang, Do Ik, *See* Kim, Se Chang, 20:7658
Chang, H.J., *See* Park, H.S., 20:7967
Chang, In Soon, *See* Yoon, Myung Hwan, 20:8189
Chang, Jong Hwa, Establishment of nuclear data evaluation system (I), 20:9193 (R;KR;In Korean)
Upgrade of one-dimensional core simulator ONED90, 20:7662 (R;KR;In Korean)
See Chang, Won Pyo, 20:9169
Chang, Kee Ok, *See* Lee, Sam Lai, 20:7660
Chang, L.J., *See* Tomy, C.V., 20:8982
Chang, M.S., *See* Park, H.S., 20:7967
Chang, S.C., Engineering scale mixing system tests for MWTF title II design, 20:7386 (R;US)
Chang, Sae Jung, *See* Kang, Young Ho, 20:8100
Chang, Seok Kyu, *See* Chung, Moon Ki, 20:7686
Chang, Si Young, Development of radiation protection and measurement technology -A study on the radiation and environmental safety-, 20:8623 (R;KR;In Korean)
Chang, Won Pyo, The development of LOCA analysis codes for nuclear power plant, 20:7664 (R;KR;In Korean)
The development of nuclear plant analysis code TASS (Transients and setpoints simulation), 20:9169 (R;KR;In Korean)
Chapin, F.S. III, Controls over nutrient flow through plants and microbes in Arctic tundra. Final technical report, 20:8586 (R;US)
Chapman, J., *See* Albright, W., 20:7443
Chapman, J.B., Classification of groundwater at the Nevada Test Site, 20:8471 (R;US)
The application of borehole logging to characterize the hydrogeology of the Faultless site, Central Nevada Test Area, 20:8472 (R;US)
Chapman, J.F., Gas cooling - a worldwide overview, 20:7995 (RA;US)
Char, K., *See* Rozeveld, S., 20:9026
Charikova, N.I., *See* Prilepo, V.L., 20:8090
Chase, J.A., Mixed Waste Management Facility groundwater monitoring report. Second quarter 1994, 20:8519 (R;US)
Chason, E., Non-destructive characterization of porous silicon using X-ray reflectivity, 20:8145 (R;US)
Chatrchyan, S.A., *See* Abraamyan, Kh.U., 20:8936
Chattin, F.R., *See* Brunson, R.R., 20:7334
Chattopadhyay, S., Exotic colliders, 20:8295 (R;US)
Chauhan, S., *See* Jones, E.O., 20:8038
Chechik, R., *See* Giberkhteerman, A., 20:8993
Chen Chiqing, *See* Wang Yansen, 20:8899
Chen Chun, *See* Lee Chengchung, 20:8976
Chen Falai, Tracing a planar algebraic curve, 20:8670 (R;XA)
Chen Guoliang, Application of gas geochemistry in the search for different types of uranium deposits. Final report for the period 15 November 1991 - 15 March 1994, 20:7262 (R;XA)
Chen Hong, *See* Zhang Yumei, 20:9039
Chen Jianxin, *See* Wang Yansen, 20:8899
Chen Jinyu, Effect of rouleaux size of erythrocyte on blood viscosity, 20:8700 (R;XA)
Chen Qiankun, *See* Qi Huiquan, 20:8898
Chen Yuqi, *See* Chang Chaohsi, 20:8790
Chen Zhenpeng, *See* Qi Huiquan, 20:8898
Chen, J., *See* Zasadzinski, J., 20:8117
Chen, L., *See* Cheng, C.Z., 20:9081
Chen, M., *See* Krasnokutskij, R.N., 20:8369
Chen, Pisin, *See* Huang, Zhirong, 20:8326
Chen, S.Y., Development of risk-based computer models for deriving criteria on residual radioactivity and recycling, 20:7466 (R;US)
Chen, Z., Silicon surface and bulk defect passivation by low temperature PECVD oxides and nitrides, 20:7587 (R;US)
See Doshi, P., 20:7595
Cheng, C.Z., Energetic/alpha particle effects on MHD modes and transport, 20:9081 (R;US)
Cheng, S., *See* Ali, R., 20:8958
Cheon, Ki Jeong, *See* Lee, Kang Suk, 20:8590
Cheon, Se Woo, *See* Lee, Jung Woon, 20:9145
Cheong, Yong Moo, Development of non-destructive testing technology for the crack-like defects of steam generator tubes (II), 20:8262 (R;KR;In Korean)
Cheplakov, A.P., *See* Ermakov, K.N., 20:8932
Chepurnov, A.S., *See* Alimov, A.S., 20:8921
Cheremukhin, A., Investigation of Silicon Planar Detectors for LHC project, 20:8378 (R;XJ)
Cherenda, N.N., *See* Uglov, V.V., 20:8096
Chernikova, T.V., *See* Shimanskaya, T.M., 20:7691
Chernov, G.M., *See* Belaga, V.V., 20:8935
Chi, Se Hwan, *See* Hong, Jun Hwa, 20:8099, 20:8263
Chiao, T., Addendum 3 to CSAR 80-027, Use of calorimeter 109B for fissile material measurement, 20:8246 (R;US)
Chichilnisky, G., Global environmental risks and financial instruments, 20:7898 (RA;CH)
Chigirinskij, Yu.I., *See* Pitirimova, N.A., 20:9008
Chiw, P., Household energy and nutrition. A study of low-income households in Lusaka, 20:8009 (R;SE)
Chizhov, M.V., Large Scale Periodicity of the Universe and Baryogenesis, 20:8730 (R;XJ)
New Tensor Interaction and the K_L -K_S Mass Difference, 20:8765 (R;XJ)
New Tensor Interactions in μ - Decay, 20:8799 (R;XJ)
See Avdeev, L.V., 20:8731
Cho, Byeong Ryeol, *See* Hwang, Sung Tai, 20:7678
Cho, Chang Yeon, *See* Cho, Man, 20:7677
Cho, Chul Koo, *See* Ji, Young Hoon, 20:8389
Cho, Dae Sik, *See* Choi, Chang Beom, 20:7671
Cho, E.H., *See* Peng, F.F., 20:7089
Cho, H.D., *See* Lee, H.K., 20:7970
Cho, Han Ok, Studies on safety and efficacy of gamma-irradiated ginseng -Development of irradiation techniques for quality improvement of ginseng products, 20:8604 (R;KR;In Korean)
See Byeon, Myeong Uh, 20:8605
See Kim, Jae Rok, 20:8602
Cho, Jae Seon, *See* Rhee, Bo Wook, 20:7683
Cho, Jae Wan, *See* Kim, Jeong Moog, 20:8233
Cho, M.J., *See* Park, Y.J., 20:8047

Cho, Man, Liquid metal reactor development, 20:7677 (R;KR;In Korean)
Cho, S., *See* Hong, S.H., 20:7964
Cho, S.C., Development of the software for energy savings in chemical processes(I), 20:8026 (R;KR;In Korean)
Cho, S.H., *See* Jeon, H.S., 20:7966
See Kim, D.H., 20:7973
See Son, J.I., 20:8457
Cho, Seok Hong, *See* Cho, Man, 20:7677
Cho, Seong Ki, *See* Byeon, Myeong Uh, 20:8605
See Cho, Han Ok, 20:8604
Cho, Seong Oh, *See* Lee, Jong Min, 20:8232, 20:8293
Cho, Seong Won, *See* Lee, Ji Bok, 20:7774
Cho, Song Won, *See* Kim, Hee Dong, 20:9172
Cho, Suck Hong, *See* Yang, Maeng Ho, 20:9140
Cho, Suk Hong, *See* Kim, Hwa Sup: Yang, Maeng Ho, 20:7883
Cho, Y.I., Development of advanced low-temperature heat transfer fluids for district heating and cooling, final report, 20:8249 (R;US)
Cho, Y.S., *See* Yang, Y.S, 20:7602
Cho, Yeong Hyeon, *See* Park, Hyeon Soo, 20:7320
Cho, Yeong Kyoon, *See* Yoo, Keon Joong, 20:7657
Cho, Yeong Kyun, *See* Park, Chang Kyu, 20:9171
Cho, Yeong Ro, *See* Chung, Moon Ki, 20:7686
See Yoo, Kun Joong, 20:7665
Cho, Young Cherl, *See* Chang, Jong Hwa, 20:7662
Cho, Young Hyeon, *See* Chung, Heung Seok, 20:7515
Cho, Young Hyun, *See* Sung, Ki Woung, 20:8171
Cho, Young Sik, *See* Chang, Jong Hwa, 20:7662
Choe, An Seong, *See* Lee, Jong Min, 20:8231
Choi, An Sung, *See* Lee, Jong Min, 20:7516
Choi, Byeong Ho, *See* Hwang, Churl Kew, 20:9068
See Lee, Jong Min, 20:8232, 20:8293
Choi, Byeong Hoon, *See* Kim, Huhn Jun, 20:8391
Choi, Byung Ho, Development of industrial ion implantation technology, 20:9011 (R;KR;In Korean)
Choi, C.J., *See* Lee, C.H., 20:7978
Choi, Chang Beom, Development of fabrication technology for CANDU advanced fuel -Development of the advanced CANDU technology-, 20:7671 (R;KR;In Korean)
Choi, Chang Shik, *See* Yoon, Myoung Hwan, 20:8170
Choi, Cheol Jin, *See* Seok, Ho Cheon, 20:7669
Choi, Han Rim, *See* Seok, Ho Cheon, 20:7669
Choi, Hang Bok, *See* Rhee, Bo Wook, 20:7683
Choi, Hwa Lim, *See* Kim, Chul Jung, 20:8702
See Lee, Jong Min, 20:8169
Choi, Hwa Rim, *See* Lee, Jong Min, 20:8232, 20:8293
Choi, Hyeon Ho, *See* Chung, Moon Kyu, 20:7655
Choi, Hyeong Nae, *See* Park, Hyeon Soo, 20:7510
Choi, Hyoung Nae, *See* Hong, Jong Sook, 20:7509
Choi, I.S., Development of industrial waste heat recovery system using chemical heat pump with NH_3-salt(I), 20:7971 (R;KR;In Korean)
See Lee, H.K., 20:7970
Choi, Il Kwon, *See* Choi, Chang Beom, 20:7671
Choi, J., Real Higgs singlet and electroweak phase transition in the standard model, 20:8771 (R;AU)
Choi, Jong Ho, *See* Seok, Ho Cheon, 20:7669
Choi, Jong Hyeon, *See* Hwang, Sung Tai, 20:7678
Choi, Jong Won, *See* Park, Hyeon Soo, 20:7320
See Park, Hyun Soo, 20:7672
Choi, Jung In, *See* Kim, Se Chang, 20:7658
Choi, K.B., *See* Park, S.I., 20:8267
Choi, Kwang, *See* Lee, Ji Ho, 20:9192
Choi, Moon Sik, *See* Ji, Young Hoon, 20:8389
Choi, Myung Jin, *See* Chung, Chong Eun, 20:8390
Choi, Sang Do, *See* Lee, Chang Woo, 20:8619
See Lee, Jeong Ho, 20:8618, 20:8622
Choi, Seon Yeong, *See* Park, Chang Kyu, 20:9171
Choi, Seung J., *See* Rader, D.J., 20:8149
Choi, Sun Young, *See* Park, Chang Kyu, 20:9170
Choi, W.K., *See* Choi, I.S., 20:7971
See Lee, H.K., 20:7970
See Son, J.I., 20:8457
Choi, Yeong Myeong, *See* Cho, Man, 20:7677
See Oh, Keun Bae, 20:9141
Choi, Yeong Rok, *See* Choi, Young Myung, 20:9143
See Oh, Keun Bae, 20:9141
Choi, Yong Ho, *See* Lee, Chang Woo, 20:8619
See Lee, Jeong Ho, 20:8618, 20:8622
Choi, Yong Kil, *See* Moon, Byung Soo, 20:7749
Choi, Yoon Dong, *See* Chun, Kwan Sik, 20:7755
See Chung, Heung Seok, 20:7517
Choi, Young, *See* Park, Chang Kyu, 20:9171
Choi, Young Gil, *See* Chang, Jong Hwa, 20:7662
See Min, Byung Joo, 20:9191
Choi, Young Myung, A study on international nuclear cooperation and technology self-reliance strategies for nuclear development in other countries, 20:9146 (R;KR;In Korean)
A study on the status of nuclear development and utilization in North Korea, 20:9143 (R;KR;In Korean)
Choi, Yun Dong, *See* Hwang, Sung Tai, 20:7678
Cholakov, V.D., *See* Belov, A.G., 20:8289
Choo, Kee Nam, *See* Ryu, Woo Seong, 20:7693
Chornack, M.P., *See* Blout, D.O., 20:7366
Choucri, N., Politics and public policy: critical factors for sustainability in the energy sector, 20:7836 (IA;CH)
Choudhury, D.K., On approach to double asymptotic scaling at low x, 20:8760 (R;XA)
Choun, Young Chun, *See* Lee, Ji Ho, 20:9192
Choung, Hyun Suk, *See* Lee, Ji Ho, 20:9192
Chouraqui, P., *See* Weininger, J., 20:8587
Chrien, R.E., *See* Rusek, A., 20:8879
Christensen, D., *See* Penney, T., 20:8062
Christensen, T., New method for cleaning ground water which contains chromate, 20:8502 (RA;DK;In Danish)
Christl, R.J., 200 Area weekly report, 20:7308 (R;US)
200 Area weekly report, 20:7309 (R;US)
200 Area weekly report, 20:7310 (R;US)
Chu, T.L., *See* Whitehead, D.W., 20:7650
Chubarov, O.V., *See* Alimov, A.S., 20:8921
Chugh, Y.P., Management of dry flue gas desulfurization by-products in underground mines. Annual report, October 1993–September 1994, 20:7153 (R;US)
Chun, E.J., Structure formation with majoron supermultiplet, 20:8759 (R;XA)
Chun, Hyeong Gil, *See* Chung, Moon Ki, 20:7686
Chun, Ki Jeong, *See* Chun, Kwan Sik, 20:7755
Chun, Kwan Sik, A feasibility study on the industialization of catalytic process in connection with domestic chemical plants, 20:7518 (R;KR;In Korean)
Analysis of chemical factors affecting marine ecosystem around nuclear power plant, 20:7755 (R;KR;In Korean)
See Park, Hyeon Soo, 20:7320
Chun, Shee Yeong, *See* Chung, Moon Ki, 20:7686
See Yoo, Kun Joong, 20:7665
Chun, W.G., *See* Kang, Y.H., 20:7968
See Kim, D.H., 20:7973
See Lim, S.H., 20:7972
Chung, Beop Dong, *See* Chang, Won Pyo, 20:7664
Chung, Chang Hwan, *See* Chung, Moon Ki, 20:7686
Chung, Chang Joon, *See* Rhee, Bo Wook, 20:7683
Chung, Chang Kyu, *See* Yoo, Geun Jong, 20:8252
Chung, Chin Man, *See* Kim, Chul Jung, 20:8702
Chung, Chong Eun, Domestic production of control parts for the nuclear waste treatment facility, 20:8390 (R;KR;In Korean)
See Park, Kwang Hyun, 20:8617
Chung, Deok Yeon, *See* Chang, Si Young, 20:8623
Chung, H.M., Effect of dynamically charged helium on mechanical properties of vanadium-base alloys, 20:9093 (R;US)
Swelling and structure of vanadium-base alloys irradiated in the dynamic helium charging experiment, 20:8070 (R;US)
Chung, Han Sub, *See* Kim, Uh Chul, 20:7694, 20:8264
Chung, Heung Joon, *See* Chung, Moon Ki, 20:7686
Chung, Heung Seok, A study on the polymer catalyst manufacturing technology, 20:7517 (R;KR;In Korean)
Development of polymer catalyst manufacturing technology, 20:7515 (R;KR;In Korean)
See Chun, Kwan Sik, 20:7518

Chung, Hoong Suck, *See* Sung, Ki Woung, 20:8171
Chung, Jang Hwan, Verification tests for CANDU advanced fuel - Development of the advanced CANDU technology-, 20:7670 (R;KR;In Korean)
Chung, Ki Hyung, *See* Choi, Byung Ho, 20:9011
Chung, Man Kyo, *See* Kuk, Il Hiun, 20:8101
Chung, Moon Ki, Thermal hydraulic tests for reactor safety system - Research on the improvement of nuclear safety-, 20:7686 (R;KR;In Korean)
See Cha, Jong Hee, 20:7690
See Yoo, Kun Joong, 20:7665
Chung, Moon Kyu, Development of standard logic network for PWR NSSS system design, 20:7655 (R;KR;In Korean)
See In, Sang Ryul, 20:9107
Chung, Se Won, *See* Sim, Yoon Sub, 20:7663
Chung, Seung Ho, *See* Hwang, Churl Kew, 20:9068
Chung, Yeong Jong, *See* Chang, Won Pyo, 20:7664
Chung, Yong Sam, *See* Kim, Jae Rok, 20:7519
Chung, Yong Won, *See* Chung, Heung Seok, 20:7517
Chung, Young Ju, *See* Kim, Jae Rok, 20:7519
Churkin, I.N., *See* Antipin, D.V., 20:9060
See Volosov, V.I., 20:9067
Chuvilo, I.V., Technical policy with radioactive wastes management, 20:7354 (IA;CH)
Cicero, C.A., Vitrification Studies with DOE Low-Level Mixed Waste Wastewater Treatment Sludges, 20:7429 (R;US)
Cierjacks, S., The intense T-H_2O neutron source, 20:7527 (IA;DE)
Ciftcioglu, O., *See* Tuerkcan, E., 20:7714
See Turkcan, E., 20:7736
Clapp, R.B., Third annual environmental restoration monitoring and assessment report for FY 1994 of the Oak Ridge National Laboratory, Oak Ridge, Tennessee, 20:7471 (R;US)
Clark, D.E., A comparison of noxious facilities' impacts for home owners versus renters, 20:7848 (R;US)
Clauss, L., Integrated planning: A baseline development perspective, 20:7475 (R;US)
Clayton, C., *See* Kero, R., 20:9188
Clemeston, C.J., *See* Farmer, O.T. III, 20:7352
Clifford, J.R., *See* Turman, B.N., 20:8130
Coburn, M.D., ADMPT and its synthesis, 20:8190 (PA;US)
Synthesis of 3,6-diamino-1,2,4,5-tetrazine, 20:8423 (PA;US)
Coel, B.J., *See* Weinberg, A., 20:7151
Coensgen, F.H., Mirror beam plasma neutron source, 20:9120 (IA;DE)
Coffey, G., *See* Stevenson, J., 20:7920
Cohen, T.D., Pseudo-Goldstone modes in isospin-asymmetric nuclear matter, 20:8853 (R;US)
Cole, R., *See* Wehner, S., 20:7224
Colella, P., *See* Pember, R.B., 20:8220
Coleman, C.J., *See* Hobbs, D.T., 20:7425
Coleman, M.M., *See* Schobert, H.H., 20:7247
Colgan, P.A., *See* Madden, J.S., 20:8465
Colin C, A., *See* Moreno A, J., 20:8208
Collatz, R.D., Particle-phonon excitations in valence-neutron and valence-proton nuclei around ^{146}Gd, 20:8866 (R;DE;In German)
Collins, C.H., *See* Carvalhinho, C.C.L., 20:8163
Collins, E.D., *See* Brunson, R.R., 20:7334
Collins, K.E., *See* Carvalhinho, C.C.L., 20:8163
Colton, N.G., Tank waste processing analysis: Database development, tank-by-tank processing requirements, and examples of pretreatment sequences and schedules as applied to Hanford Double-Shell Tank Supernatant Waste - FY 1993, 20:7338 (R;US)
Colyer, S.P., *See* Frome, E.L., 20:8644
Comolli, A.G., Catalytic multi-stage liquefaction of coal. Seventh quarterly report-final, April 1, 1994–June 30, 1994, 20:7134 (R;US)
Conca, J.L., Transport in porous and fractured media of the Creede Formation, 20:7606 (R;US)
See Wright, J., 20:7452
Conover, D.R., Differences between the 1992 and 1993 CABO Model Energy Codes, 20:8008 (R;US)
Conrad, B., CD-ROM in the age of internet, 20:9160 (R;US)
Coon, S.A., Universality of $\Delta I = 1$ meson mixing and charge symmetry breaking, 20:8867 (R;AU)
Cooper, D., Emission measurements from a urea-based SCR/oxi catalytic NO_x/HC exhaust gas treatment system on board a diesel powered passenger ferry - operation after 12000 hours service, 20:8455 (R;SE)
Cooper, E.N., Community radiation monitoring program. Annual report, October 1, 1992–September 30, 1993, 20:8435 (R;US)
Cooper, R., *See* Sikka, V.K., 20:8075
Corbet, T.F., Evolution of patterns of regional groundwater flow in southeastern New Mexico: Response to post-Pleistocene changes in climate, 20:7294 (R;US)
Corbus, D., *See* Holz, R., 20:8049
Coriano, C., Scale-invariant Lipatov kernels from t-channel unitarity, 20:8709 (R;US)
Coroneos, A.C., Bench-scale treatability studies for simulated incinerator scrubber blowdown containing radioactive cesium and strontium, 20:7335 (R;US)
Corradini, M.L., *See* Boyack, B.E., 20:7817
Cortes, C., *See* Francois, J.L., 20:7645
Costa, M.F.C., *See* Carvalhinho, C.C.L., 20:8163
Costella, J.P., The Foldy-Wouthuysen transformation, 20:8751 (R;AU)
Costello, J.F., *See* Hofmayer, C.H., 20:7781
Cottrell, L., *See* Swartz, K.L., 20:9187
Court, J.D., Benchmark analysis of MCNP™ ENDF/B-VI iron, 20:8948 (R;US)
Lawrence Livermore pulsed sphere benchmark analysis of MCNP™ ENDF/B-VI, 20:8949 (R;US)
Covey, C., Global ocean circulation and equator-pole heat transport as a function of ocean GCM resolution, 20:8548 (R;US)
Cowan, P.L., *See* Knapp, G.S., 20:8309
Cowen, D.J., *See* Bresnaham, P.J., 20:7503
Cowley, S.C., *See* Beer, M.A., 20:9085
Cox, J., *See* Malamud, E., 20:8654
Craig, R.A., *See* Bliss, M., 20:8593
Cramer, J., Final report of the AECL/SKB Cigar Lake analog study, 20:7358 (R;SE)
Crane, A.F., 200 Area treated effluent disposal facility operational test specification, 20:7374 (R;US)
Crane, D., Long-baseline neutrino oscillation experiments, 20:8823 (R;US)
Crawford, C.L., Radiolytic Hydrogen Production During the Long Term Storage of Spent Organic Ion Exchange Resins, 20:7430 (R;US)
Creutz, M., Chiral symmetry on the lattice, 20:8710 (R;US)
See Glaessner, U., 20:8712
Cuevas, A., Extraction of the surface recombination velocity of passivated phosphorus-doped silicon emitters, 20:7590 (R;US)
Cullinan, V.A., *See* Lestelle, L.C., 20:8523
Cumbest, R.J., Magnetic Survey of the Hydroflouric Acid Spill Area, 20:7464 (R;US)
Cummings, U., *See* Fetzko, S., 20:8327
Cunnane, J.C., *See* Buck, E.C., 20:7441
Cunningham, L.C., CALSON Process, 20:9195 (R;US)
Cunningham, R.E., Reformulated gasoline study, executive summary, 20:7242 (R;US)
Curtin, W.A., Investigation of properties and performance of ceramic composite components. Final report on Phase 2, 20:8143 (R;US)
Curtis, C.W., Low severity coal liquefaction promoted by cyclic olefins. Quarterly report, July–September, 1994, 20:7131 (R;US)
The role of the resid solvent in coprocessing with finely divided catalysts. Quarterly report, July–September, 1994, 20:7129 (R;US)
Cutting, J.C., *See* Carabetta, R.A., 20:7259

D

D'Amico, N., *See* McLaughlin, D.F., 20:7422
D'Araujo, P.A.P., Hydrodenitrogenation mechanism of aromatic amines. Kinetic study and simulation, 20:7902 (R;FR;In French)
D'Azevedo, E.F., DOLIB: Distributed Object Library, 20:9181 (R;US)
Dahan, I., *See* Kimmel, G., 20:8155
Dahlbom, P., Contaminant migration in rock aquifers, 20:7331 (R;SE)

Dahlhaus, N., Automation in mining - sensor for position monitoring. Mining requirements, machine integration, testing. Final report, 20:7163 (R;DE;In German)
Dahlkamp, F.J., International comparison of environmental protection provisions in remedial actions on uranium mine and mill tailings, 20:8492 (IA;CZ;In German)
Daisey, J.M., Toxic volatile organic compounds in environmental tobacco smoke: Emission factors for modeling exposures of California populations, 20:8461 (R;US)
Dalen, G., Lightning protection of large rotor blades design and experience, 20:7614 (RA;DK)
Daley, R.S., *See* Anz, S.J., 20:8176
Daley, T.M., Combined analysis of surface reflection imaging and vertical seismic profiling at Yucca Mountain, Nevada, 20:7329 (R;US)
Damodaran, A.D., *See* Warrier, K.G.K., 20:8116
Dana, C.M., *See* Gilbert, E.R., 20:7666
Danelyan, L.S., *See* Gordeeva, G.V., 20:8091
Dang Lamzh Nguen Mak Kha, *See* Romanovskij, E.A., 20:8986
Dang Van Soa, *See* Hoang Ngoc Long, 20:8757
Daniel, M., Dynamics of an inhomogeneous anisotropic antiferromagnetic spin chain, 20:9024 (R;XA)
Danielewicz, P., Shock compression and expansion in central collisions, 20:8908 (R;US)
Darab, J.G., *See* Matson, D.W., 20:7231
Darby, J., *See* Dingman, S.E., 20:7649
Darling, D.H., *See* Simpson, R.L., 20:8111
Darr, M.F., *See* McLaughlin, D.F., 20:7422
Darrow, D.S., *See* Zweben, S.J., 20:9088
Dart, M., *See* Swartz, K.L., 20:9187
Darvas, J., Fusion Programme Evaluation Board, 20:9111 (IA;DE)
Darvill, A.G., Structural studies of complex carbohydrates of plant cell walls. Progress report, June 15, 1992–June 14, 1993, 20:8568 (R;US)
Datta, A., Signatures of virtual LSPs at the TEVATRON, 20:8831 (R;XA)
Dauben, D.L., Simulation studies to evaluate the effect of fracture closure in the performance of naturally fractured reservoirs. Third quarterly progress report, 20:7196 (R;US)
David, D., *See* Barak, J., 20:8406
See Ilberg, D., 20:8408
Davis, A., *See* Mitchell, G., 20:7148
Davis, B., Field measurements of heating efficiency of electric forced-air furnaces in six manufactured homes, 20:7960 (R;US)
Davis, J.R., Experimental Chemical Milling Process to Decontaminate and Disposition Reactor Fuel at the Savannah River Site, 20:7431 (R;US)
Davis, K., *See* Hangarter, R., 20:8597
Davis, R., *See* Levron, D., 20:8954
Davis, S., *See* Barnes, D., 20:9125
Davydenko, V.I., Radial electric field measurement in a tokamak by the injection of a pulsed neutral beam, 20:9042 (R;RU)
Dawson, S., Probing anomalous gauge boson couplings at LEP, 20:8753 (R;US)
Dayan, D., Shear-like transformation in dilute U-W alloys, 20:8087 (RA;IL)
De Haas, J.C.M., *See* Luce, T.C., 20:9048
Decaire, B.R., Blowing agents: The next generation, 20:8034 (RA;US)
Dechert, T.V., Aggradational and erosional history of the Radioactive Waste Management Complex at the Idaho National Engineering Laboratory, 20:7311 (R;US)
Decker, F.J., Over-compression, a method to shape the longitudinal bunch distribution for a reduced energy spread, 20:8307 (R;US)
Deen, J.R., Validation of the WIMSD4M cross-section generation code with benchmark results, 20:7761 (R;US)
See Bretscher, M.M., 20:7763
Deev, A.S., *See* Grinchenko, A.Yu., 20:8946
Deevi, S.C., *See* Suuberg, E.M., 20:7087
Degueldre, C.A., Colloid properties in groundwaters from crystalline formations, 20:8513 (R;CH)
Dehghani, M.H., *See* Rezania, V., 20:8728
Del Mastro, N.L., Impedance measurement of irradiated potatoes: a method to identify radiation processing., 20:8207 (IA;MX)
Delegard, C.H., Chemistry of proposed calcination/dissolution processing of Hanford Site tank wastes, 20:7369 (R;US)
Delincee, H., *See* Schreiber, G.A., 20:8600, 20:8601
Dell, L.D., Quality assurance FY 1995 site support program plan WBS 6.7.2.5, 20:7424 (R;US)
Dellera, L., Lightning stroke simulation by means of a leader progression model, 20:7617 (RA;DK)
Demmel, S., *See* Alefeld, G., 20:7994
Denbo, D.W., Onset time and strength of oceanic deep convection diagnosed from an ocean large-eddy simulation model, 20:8546 (R;US)
Deninger, W.J., *See* Yapuncich, M.L., 20:9176
Denning, R.S., *See* Boyack, B.E., 20:7817
Dent, C., *See* Koca, R., 20:8019
Deo, M.D., *See* Lomax, J.D., 20:7216
Depp, D., *See* Conrad, B., 20:9160
Derenzo, S.E., *See* Moses, W.W., 20:8392
Deruyter, H., *See* Wang, J.W., 20:8328
Desnica, U.V., *See* Ivanda, M., 20:8992
Desnoyers, B., *See* Renard, C., 20:7280
Despa, F., The one-dimensional model of the off-centre potential of the fluorine ion in the NaBr lattice, 20:8978 (R;XA)
Dev, H., Demonstration testing and evaluation of in situ soil heating. Health and safety plan (Revision 2), 20:7302 (R;US)
Dever, L., *See* Njitchoua, R., 20:8486
DeVore, J.R., Technology study of Gunite tank sludge mobilization at Oak Ridge National Laboratory, Oak Ridge, Tennessee, 20:7484 (R;US)
Di Dong, The iteration formula of the Maslov-type index theory with applications to nonlinear Hamiltonian systems, 20:8674 (R;XA)
Di Marzio, F., The evaluation of specific types of integrals involving confluent hypergeometric functions, 20:8943 (R;AU)
Diarra, S., *See* Alpha, A., 20:8534
See Sissoko, M.F., 20:8487
Diaz, A.F., Conversion of light hydrocarbon gases to metal carbides for production of liquid fuels and chemicals. Quarterly technical status report, July 1–September 30, 1994, 20:7248 (R;US)
Diaz, O., *See* Malamud, E., 20:8654
Diaz, P., *See* Grambow, B., 20:8126
Diaz, R., Char particle fragmentation and its effect on unburned carbon during pulverized coal combustion. Quarterly report, April 1–June 30, 1994, 20:7176 (R;US)
Dickson, A.G., Handbook of methods for the analysis of the various parameters of the carbon dioxide system in sea water. Version 2, 20:8544 (R;US)
Didierjean, F., Fast successive charge captures in the positron spur by halogenated compounds in methanol., 20:8967 (IA;MX)
Diebold, G.E., *See* Rusek, A., 20:8879
Dienst, W., *See* Billone, M.C., 20:7674
Dietz, N.L., *See* Buck, E.C., 20:7441
Dighe, S.V., *See* McLaughlin, D.F., 20:7422
Dillmann, H.G., Technical boundary conditions for an accident filter, 20:7808 (RA;DE;In German)
Dilmanian, F.A., *See* Alessi, J.G., 20:8283
Dimitrova, S.S., *See* Gaidarov, M.K., 20:8859
Dingman, S.E., Core damage frequency observations and insights of LWRs based on the IPEs, 20:7649 (R;US)
Dixon, K.D., *See* Niemann, R.C., 20:7826
Dixon, K.L., Sampling and analysis of soil from the old F-Area effluent ditch and its surrounding wetlands, 20:7435 (R;US)
Dixon, L., *See* Bern, Z., 20:8769
Dmitriev, V.F., Nuclear anapole moments in single-particle approximation, 20:8848 (R;RU)
Nuclear magnetic quadrupole moments in single-particle approximation, 20:8849 (R;RU)
Dmitrievskij, V.P., *See* Vorozhtsov, S.B., 20:8280
Doane, E.P., Scale-up of mild gasification to a process development unit. Quarterly report, February 1994–May 1994, 20:7103 (R;US)
Dobranich, D., *See* Shen, D.S., 20:8279
Dodd, B., Results of the MCNP analysis of 20/20 LEU fuel for the Oregon State University TRIGA Reactor, 20:7765 (R;US)
Dodds, R., Plutonium arisings and utilization in the United Kingdom, 20:7274 (RA;XA)
Dodge, L., *See* Bourn, G., 20:8064

Dokukin, E.B., Investigation of Fe_3O_4 Colloid Behaviour in a Magnetic Field by Polarized Neutron Transmission, 20:8987 (R;XJ)
Dolensky, B., Containment concepts and load carrying capacity, 20:7810 (RA;DE)
Doll, W.E., Airborne geophysical survey of the Oak Ridge Reservation, Tennessee, 20:7445 (R;US)
Domas, J., Results of actions to reduce the amount of radon in the town of Jachymov. The nursery school building, 20:8494 (IA;CZ;In Czech)
Dominguez, D., *See* Uprety, K.K., 20:9034
Dong, In Sook, *See* Ham, Chang Shik, 20:8336
See Kim, Jae Hui, 20:7748
Dong, S.K., *See* Noh, D.S., 20:7258
See Park, S.I., 20:8267
Donnelly, R.J., Cryogenic helium gas convection research, 20:8250 (R;US)
Doran, D., Summary of IEA neutron source working group activities, 20:7531 (IA;DE)
Dorokhov, A.E., Electromagnetic Hadron Mass Differences and Estimation of Isotopic Symmetry Violation Parameters of QCD Vacuum from Quark Model, 20:8763 (R;XJ)
Dorris, S.E., *See* Parrell, J.A., 20:8115
Dortmans, P.J., Complex conjugate pairs in stationary Sturmians, 20:8745 (R;AU)
Density dependent effective interactions, 20:8820 (R;AU)
Doshi, P., Rapid thermal processing of high-efficiency silicon solar cells with controlled in-situ annealing, 20:7595 (R;US)
Doshi, R., *See* Krumpelt, M., 20:7915, 20:7921
Dougherty, R.L., *See* Reynolds, J.F., 20:8569
Douglas, J.M., A general procedure for the synthesis of process flowsheets. Final report, July 16, 1991–July 31, 1993, 20:8020 (R;US)
Dounaev, V.G., The concept of an information support system for operational personnel of operating nuclear power plants, 20:7720 (RA;XA)
Dow, J.A., *See* Leonard, R.A., 20:7289
Downey, N.J., Vault Safety and Inventory System users manual, PRIME 2350. Revision 1, 20:7512 (R;US)
Doyon, J., *See* Bernard, R., 20:7943
Drain, F., French engineering design rules for safe handling and storage of plutonium, 20:7279 (RA;XA)
Drakin, K.A., *See* Petrova, A.G., 20:9003
Dressler, P., *See* Grambow, B., 20:8126
Drewery, J.S., *See* Hong, Wan-Shick, 20:8393
Drouin, M.T., *See* Dingman, S.E., 20:7649
Droz, C., *See* Schreiber, G.A., 20:8600
Duan Wenxian, *See* Zhao Yunlong, 20:8342
Dubkov, S.L., *See* Anosov, A.I., 20:7725
Dubnicka, S., Unitarization of Koerner-Kuroda model of electromagnetic structure of octet $1/2^+$ baryons, 20:8792 (R;XA)
Dubnickova, A.Z., *See* Dubnicka, S., 20:8792
DuBois, C., *See* Cuevas, A., 20:7590
Dudar, A.M., Autonomous mobile robot for radiologic surveys, 20:8241 (PA;US)
Duddy, J.E., Bench-scale development of coal/oil co-processing technology. Twelfth quarterly report, 1 July–30 September 1990, 20:7110 (R;US)
Duffy, J.T., *See* Madden, J.S., 20:8465
Duignan, M.R., Development of Liquid Level and Density Bubbler for DWPF Canyon Vessels. Final report, 20:7439 (R;US)
Dunbar, D.C., *See* Bern, Z., 20:8769
Duncan, J.B., *See* Reich, F.R., 20:7370
Dunlap, K., *See* Kero, R., 20:9188
Dunn, A.M., The influence of CDM on the dynamical estimate of Ω in the local neighborhood, 20:8703 (R;US)
Duplatre, G., Fast reactions in the positron spur in polar solvents., 20:8968 (IA;MX)
See Didierjean, F., 20:8967
Dupont, J.N., *See* Levin, B.F., 20:8078
Duran, G., Amorphous silicon photovoltaic manufacturing technology - Phase 2A. Annual subcontract report, May 1, 1993–April 30, 1994, 20:7583 (R;US)
Durant, J.L. Jr., *See* Paul, P.H., 20:8963
Dutta, D., *See* Chugh, Y.P., 20:7153
Duvnitz, E., *See* Ellenbogen, E., 20:8358
See Ellenbogen, M., 20:8356
Duvniz, E., *See* Mazor, T., 20:8354
Duzinkiewicz, K., *See* Kosmowski, K.T., 20:7642
Dvall, G., *See* Berezhiani, V.I., 20:8722

E

Earwaker, L.G., *See* Peyrovan, H., 20:8985
Ebert, D., *See* Roth, R., 20:8466
Edlund, D.J., A practical method of hydrogen purification for use in fuel-cell systems, 20:7934 (RA;US)
Edwards, D.J., *See* Greenwood, L.R., 20:8105
Egan, J.J., *See* Kegel, G.H.R., 20:8906
Egnell, R., Impact of combustion chamber geometry on charge stratification in a CNG fueled direct injection Otto engine, 20:8058 (R;SE)
Egorova, I.M., *See* Gordeeva, G.V., 20:8091
Ehler, G.B., *See* Bresnaham, P.J., 20:7503
Ehmeksuzyan, V.M., Modification of properties in proton implanted silicon under heat treatment, 20:8094 (IA;RU;In Russian)
Ehnders, B., *See* Tashlykov, I.S., 20:8093
Ehrhardt, J., *See* Axmann, A., 20:7785
See Benz, G., 20:7816
Ehrlich, K., Material development for fusion reactors, 20:9114 (IA;DE)
Proceedings of the IEA-workshop on intense neutron sources. IEA-implementing agreement for a programme of research and development on fusion materials. Working group task - annex II, 20:7524 (I;DE)
Eichner, J., *See* Wang, J.W., 20:8328
Eimerl, D., *See* Barker, C.E., 20:8273
Eisenberg, E., *See* Ron, S., 20:8661
See Stotland, A., 20:8599
Elam, N., Scenarios for introduction of bio-ethanol, 20:8065 (R;SE;In Swedish)
Elbaz, Y., *See* Levinson, S., 20:8364
Elgad, D., *See* Ankry, N., 20:8352
Elias, E., Nuclear power plant diagnostics using artificial neural networks, 20:7747 (RA;XA)
Eliezer, D., *See* Abramov, A., 20:9101
See Abramov, E., 20:9100
See Moreno, D., 20:8085, 20:9098, 20:9099
Elkind, M.M., *See* Casarett, G.W., 20:8627
Ellegaard, A., *See* Chiw, P., 20:8009
Ellenbogen, E., Housing for on-line radioactive contamination detection unit, 20:8358 (RA;IL)
Ellenbogen, M., RADTEST, 20:8356 (RA;IL)
See Mazor, T., 20:8354
Elliott, S., Parallel processing of atmospheric chemistry calculations: Preliminary considerations, 20:8458 (R;US)
Ellis, J.S., *See* Baskett, R.L., 20:8645
Ellis, V.L., *See* Paragamian, V.L., 20:7575
Ellison, J., Physics capabilities of the DO upgrade detector, 20:8348 (R;US)
Elmore, M.R., *See* Schmidt, A.J., 20:7351
Elshinawy, R.M.K., *See* Abdelmalik, W.E.Y., 20:8539
Emery, K., *See* Strand, T., 20:7598
Emma, P., Depolarization in the SLC Collider Arcs, 20:8306 (R;US)
Emonot, P., Finite elements volumes methods: applications to the Navier-Stokes equations and convergence results, 20:8251 (R;FR;In French)
Endo, K., *See* Sano, H., 20:8157
Endres, A.W., Site-specific calibration of the Hanford personnel neutron dosimeter, 20:8397 (R;US)
See Rathbone, B.A., 20:8396
Engedahl, H., Use of explicit finite-difference schemes and lateral open boundary conditions in numerical ocean models, 20:8652 (R;NO)
Engert, D.E., *See* Johnson, G.R., 20:9184
Engesgaard, P., *See* Traberg, R., 20:8507
Engstrom, J.W., Light Duty Utility Arm interface control document plan, 20:7380 (R;US)
Entchev, E., *See* Hayden, A.C.S., 20:7950
Eom, Heung Seop, *See* Kim, Jae Hee, 20:7695

Eperin, A.P., *See* Adamov, E.O., 20:7722
Erbacher, F.J., Thermo-hydraulic investigations on passive containment cooling, 20:7809 (RA;DE;In German)
Erickson, D.G., Criticality safety evaluation report for the 100 KE Basin sandfilter backwash pit, 20:7375 (R;US)
Eriksson, Aake, Estimated effects of radioactive fallout on agricultural production in Sweden. Contamination of crop products, 20:8634 (R;SE;In Swedish)
Estimated effects of radioactive fallout on agricultural production in Sweden. Contamination of animal products, 20:8635 (R;SE;In Swedish)
Ermakov, K.N., Study of Features in Particle and Event Characteristics in Nucleus-Nucleus Interaction, 20:8932 (R;XJ;In Russian)
Eror, N.G., *See* Krishnaraj, P., 20:8114
Ertekin, T., *See* Watson, R.W., 20:7189, 20:7190
Esenak, K., *See* Bojko, I.R., 20:8386
Eser, S., *See* Schobert, H.H., 20:7247
Eskandari, M., *See* Ghasemi Zaad, A., 20:7646
Eskandari, M.R., A new concept to increase muon cycle rate in muon catalyzed fusion, 20:9050 (IA;IR;In English, Persian)
Esling, S., *See* Chugh, Y.P., 20:7153
Esposito, F., *See* Hoskin, D., 20:7955
Essa, M.W., *See* Abdelfattah, A.T., 20:8454
Estendorfer, S., *See* Schreiber, G.A., 20:8600, 20:8601
Estrella, R., *See* Albright, W., 20:7443
Ettedgui, H., *See* Kuznietz, M., 20:8082, 20:8121, 20:8122, 20:8983
Eum, Kil Seop, *See* Chang, Won Pyo, 20:9169
Evans, S., Density-driven displacement of pore water as possible factor affecting the vertical distribution of Chernobyl-derived radionuclides in a Baltic Sea sediment, 20:8547 (R;SE)
Evelo, S.D., *See* Johnson, V.G., 20:7455
Even, O., *See* Barak, J., 20:8406
See Lifshitz, Y., 20:8407
Even, P., Interactive three dimensional simulation for generation of synthetical returns in remote handling assisted by computer, 20:8228 (R;FR;In French)
Exarhos, G.J., *See* Weber, W.J., 20:8144

F

Fadeev, N.G., *See* Ermakov, K.N., 20:8932
Fadeev, V.A., *See* Ruzicka, J., 20:9010
Fahrni, F., Sustainability as seen by the entrepreneur, 20:7837 (IA;CH)
Failace, E., Derivation of uranium residual radioactive material guidelines for the 4400 Piehl Road Site, Ottawa Lake, Michigan, 20:7467 (R;US)
Fainor, V., *See* Bojko, I.R., 20:8386
Fairbank, W.M. Jr., *See* Lee, S.A., 20:8754
Fairbrother, A., Ecological risk assessment benefits environmental management, 20:7866 (R;US)
Falen, A.L., *See* Dechert, T.V., 20:7311
Fall, M., Oxygen-18 content of modern vegetal organic matter in Senegal; relation with climatic parameters, 20:8451 (RA;XA;In French)
Fallah Shirazi, A., Cross-over electron beam ion sources, 20:8316 (IA;IR;In English, Persian)
Faltens, A., *See* Lee, E., 20:9123
Fan, Y., *See* Greene, D.L., 20:8017
Fang, J.M., Issues and methods in incorporating environmental externalities into the integrated resource planning process, 20:7863 (R;US)
Fankhauser, S., Global warming damage and the risk of a climate catastrophe, 20:7892 (RA;CH)
Fanning, J.C., *See* McCabe, D.J., 20:7433
Fant, K.H., *See* Wang, J.W., 20:8328
Farajeyan, A.A., *See* Babaei, A.A., 20:9036
Farley, S.E., *See* Leonard, R.A., 20:7289
Farmer, O.T. III, Analysis of radioactive waste samples by ion chromatography-ICP/MS, 20:7352 (R;US)
Faruq, M.U., *See* Aziz, A., 20:7778
Fasoli, A., Alfven eigenmodes active excitation experiments in JET, 20:9073 (RA;CH)
Fatemi, S.J., Quarks search in cosmic rays, 20:8793 (IA;IR;In English, Persian)
Faucheux, S., Decision-making under environmental uncertainty, 20:7895 (RA;CH)
Faude, D., *See* Benz, G., 20:7816
Faye, A., Contribution of environmental isotopes in the hydrogeological study of the Casamance's aquifers (South of Senegal), 20:8485 (RA;XA;In French)
See Fall, M., 20:8451
See Ketchemen, B., 20:8484
See Ndiaye, B., 20:8480
Fayers, F.J., Productivity and injectivity of horizontal wells. Quarterly report, July 1, 1994–September 30, 1994, 20:7205 (R;US)
Federici, G., *See* Raffray, A.R., 20:7675
Fedotov, S.A., *See* Bojko, E.B., 20:8089
Fedyakin, N.N., *See* Krasnokutskij, R.N., 20:8369
Feeley, O.C., *See* Klier, K., 20:7564
Feldmann, K., *See* Hangarter, R., 20:8597
Felise, P., Low-Level Waste Vitrification Plant Project contracting strategy decision analysis report, 20:7390 (R;US)
Felmy, A.R., A chemical model for the major electrolyte components of the Hanford waste tanks. The binary electrolytes in the system: $Na\text{-}NO_3\text{-}NO_2\text{-}SO_4\text{-}CO_3\text{-}F\text{-}PO_4\text{-}OH\text{-}Al(OH)_4\text{-}H_2O$, 20:7348 (R;US)
A solubility model for amorphous silica in concentrated electrolytes, 20:8192 (R;US)
The solubility of $Cr(OH)_3(am)$ in concentrated NaOH and NaOH-$NaNO_3$ solutions, 20:7349 (R;US)
Felter, T.E., *See* Anz, S.J., 20:8176
Feng Yuyu, *See* Chen Falai, 20:8670
Feng, J., Squark mass determination at a future linear collider, 20:8838 (R;US)
Feng, J.L., Testing supersymmetry at the next linear collider, 20:8736 (R;US)
Feng, Xiaoping, Reflection and diffraction of atomic de Broglie waves by evanescent laser waves. Bare-state method, 20:8957 (R;AU)
Ferenbaugh, R.W., Environmental analysis of Lower Pueblo/Lower Los Alamos Canyon, Los Alamos, New Mexico, 20:7477 (R;US)
Ferg, E., *See* Thackeray, M.M., 20:7829
Ferhi, A., *See* Fall, M., 20:8451
Fernandes Nodarse, F., *See* Ivanov, V.G., 20:8321
Fernandez, M., PIXE analysis setup using a proton in air beam facility at the ININ., 20:8156 (IA;MX)
PIXE analysis setup using a proton in air beam facility at the ININ., 20:8315 (IA;MX)
Fernandez-Valverde, S., Photochemical reactions of $CuInSe_2$ thin films in sulphuric acid solution., 20:8201 (IA;MX)
Ferraris, J.P., *See* Rudge, A.J., 20:7832
Fesharaki, F., *See* Pezeshki, S., 20:7237
Fessenden, T., *See* Lee, E., 20:9123
Fetisova, L.N., *See* Mikhin, V.I., 20:7701
Fetzko, S., PEP-II vacuum system - joining SS flanges to copper beam chambers, 20:8327 (R;US)
Fickett, J.W., Estimation of protein coding density in a corpus of DNA sequence data, 20:8575 (RA;US)
Fiedeldey, H., *See* Steward, C., 20:8939, 20:8942
Fiedler, J., Changes in the ground water regime in the Straz block due to uranium mining, 20:7450 (IA;CZ;In Czech)
Fieg, G., Studies of core catcher concepts, 20:7806 (RA;DE;In German)
Field, J.E., Sealed tube comparisons of the compatibility of desiccants with refrigerants and lubricants. Quarterly technical progress report, July 1994–September 1994, 20:7962 (R;US)
Figueroa, R.A., Status of 250 kW product development test at San Diego Gas & Electric, 20:7942 (RA;US)
Filip, P., The structure of a source from interferometry measurements in heavy ion collisions, 20:8911 (R;XA)
Filuk, A.B., Progress in ion beam power coupling and ion-driven hohlraums on PBFA II, 20:9126 (R;US)
Findeisen, E., X-ray and neutron scattering from amorphous diamondlike carbon and hydrocarbon films, 20:8989 (R;DK)
Finfrock, S.H., Potential tank waste material anomalies located near the liquid observation wells: Model predicted responses of a neutron moisture detection system, 20:7367 (R;US)

Finnell, D., *See* Feng, J., 20:8838
Fircks, H.A. von, Frost resistance in Salix, 20:7538 (R;SE)
Firoozabadi, A., Research program on fractured petroleum reservoirs. Quarterly progress report, July 1–September 30, 1994, 20:7206 (R;US)
Fischer, F., *See* Benz, G., 20:7816
Fischer, H., *See* Hamann, N., 20:8819
See Rusek, A., 20:8879
Fischer, J.E., *See* Schirber, J.E., 20:8147
Fiset, J.Y., *See* Jones, P.E.R., 20:7715
Fisher, L.A., *See* Butcher, T.A., 20:7951, 20:7952
Fleddermann, C.B., *See* Ruby, D.S., 20:7588
Flegel, W., Status of the project on ν-detection, 20:8318 (RA;RU)
Fleming, D.L., *See* Moos, L.P., 20:7468
Fleming, J.G., *See* Lujan, R.D., 20:8106
Fleming, R.M., *See* Schirber, J.E., 20:8147
Floden, T., *See* Wannaes, K.O., 20:8514
Flodstroem, E., Emission and energy evaluation principles for transport systems, 20:8014 (R;SE;In Swedish)
Floyd, S., Dynamics of TCP traffic over ATM networks, 20:9179 (R;US)
See Paxson, V., 20:9180
Fluekiger, R., *See* Blatter, J., 20:9032
Flytzani-Stephanopoulos,, Direct catalytic decomposition of nitric oxide. Quarterly technical progress report number 12, July–September, 1994, 20:8436 (R;US)
See Benedek, K., 20:7171
Focher, S.M., *See* Keefe, M.L., 20:7576
Foerster, C.L., Photon stimulated desorption (PSD) measurements of extruded copper and of welded copper beam chambers for the PEP II asymmetric B-factory, 20:8333 (R;US)
Fofana, A., Application of tracer dilution techniques for flow rate measurements in Sahelian Hydrology: Examples in Mali, 20:8533 (RA;XA;In French)
See Sissoko, M.F., 20:8487
Fogler, H.S., Polysaccharides and bacterial plugging. Final report, 1992–1993, 20:7200 (R;US)
Folk, R.L., A handbook for small-scale densified biomass fuel (pellets) manufacturing for local markets, 20:7539 (R;US)
Fominykh, V.I., *See* Sehrehehtehr, Zh., 20:8383
See Veselov, G.V., 20:8382
Fonda, L., Theoretical aspects of electron emission holography, 20:8995 (R;XA)
Fonseca, A., *See* Parekh, B.K., 20:7137
Fontes, J.C., *See* Faye, A., 20:8485
See Njitchoua, R., 20:8486
Forest, C.B., *See* Luce, T.C., 20:9048
Forester, J., Human event observations in the individual plant examinations, 20:7823 (R;US)
Fornek, T., Thermal effects on the STAR electromagnetic calorimeter, 20:8340 (R;US)
Fosmire, C.J., *See* Ramsdell, J.V. Jr., 20:7760
Foster, C.S., *See* Baskett, R.L., 20:8645
Foster, E.L., *See* Hutzel, W.J., 20:8416
Foster, H., *See* Doane, E.P., 20:7103
Fox, G.L., Results of falling barrier analyses, 20:7378 (R;US)
Fox, J., Computer support for cooperative tasks in Mission Operations Centers, 20:9185 (R;US)
Frabetti, P.L., *See* Cantoni, P., 20:8377
Francois, J.L., Development of a nuclear fuel reload pattern design system based on heuristic search methods, 20:7645 (RA;XA)
Frangi, J.P., *See* Joseph, A., 20:8532, 20:8536
Frank, M.R., The off-shell axial anomaly via the $\gamma^*\pi^0 \rightarrow \gamma$ transition, 20:8826 (R;US)
Frankel, N.E., *See* Glasser, M.L., 20:9025
Frankel, R.S., Concepts and techniques: Active electronics and computers in safety-critical accelerator operation, 20:8282 (R;US)
Franklin, G.B., *See* Rusek, A., 20:8879
Fransson, Aake, Energy dense water, 20:8050 (R;SE)
Increased energy capacity in district heating fluids, 20:8051 (RA;SE)
See Skoglund, P., 20:8052
Frazier, T.P., Quality Assurance Project Plan for Facility Effluent Monitoring Plan activities, 20:8518 (R;US)
Frederick, W.J., *See* Sinquefield, S.A., 20:7545
Freeman, H.D., Hanford Permanent Isolation Barrier Program: Asphalt technology data and status report - FY 1994, 20:7341 (R;US)
Freeman, S.L., Commercial equipment cost database, 20:8037 (R;US)
Freij, L., Phasing out lead and mercury, 20:7861 (R;SE)
Freud, A., The use of microwave oven for ^{51}Cr (CrIII) complexation reactions, 20:8213 (RA;IL)
Fricke, J., *See* Caps, R., 20:7990
Friemark, D., *See* Weininger, J., 20:8587
Froger, G., *See* Faucheux, S., 20:7895
Frome, E.L., Statistical methods for the analysis of a screening test for chronic beryllium disease, 20:8644 (R;US)
Fronk, M.H., Proton exchange membrane fuel cell for transportation, 20:8060 (RA;US)
Frost, C., Use of Power? EPIK - Energy Problems in Wartime, 20:7887 (R;SE;In Swedish)
Frost, R.L., *See* Niemer, K.A., 20:7285
Fuchs, K., *See* Schreiber, G.A., 20:8601
Fuciarelli, A.F., Radiation-induced electron migration along DNA, 20:8632 (R;US)
Fucugauchi, L.A., *See* Reynoso, R., 20:8969
See Zaldivar, M.E., 20:8206
Fujita, E., *See* Furenlid, L.R., 20:8179
Fujiwara, I., *See* Shibata, S., 20:8160
Fullerton, E.E., *See* Kelly, D.M., 20:8991
See Mattson, J.E., 20:8071
Fulton, J.L., Small angle X-ray scattering studies of aggregation in supercritical fluid solutions, 20:8191 (R;US)
See Bowman, L.E., 20:8055
Fulton, R.W., *See* Felmy, A.R., 20:7349
Furenlid, L.R., XAS studies of Ni(I), Ni(II), and Ni(III) complexes, 20:8179 (R;US)
Furlanetto, M.R., *See* Paul, P.H., 20:8963
Furukawa, M., *See* Shibata, S., 20:8160
Fyodorov, A., *See* Moses, W.W., 20:8392

G

Gaasterland, T., *See* Rayl, K.D., 20:8553
Gabay, Y., *See* Paran, J., 20:8366
Gabovitch, A., *See* Boneh, R., 20:8365
Gaddis, L.A., *See* Brevick, C.H., 20:7400, 20:7401
Gaddy, C., *See* Montgomery, J.C., 20:7752
Gadomski, D.M., *See* Poe, T.P., 20:7577
Gago, J., *See* Grambow, B., 20:8126
Gaidarov, M.K., Nucleon Correlation Effects on Y-Scaling Quantities in Nuclei, 20:8859 (RA;XJ)
Galtinov, A.Sh., Cascades of Nuclear Interactions in Liquid Hydrogen, 20:8924 (R;XJ)
Gajduk, P.I., Structure changing and impurity behaviour in silicon under phosphorus 'hot' implantation and annealing, 20:8996 (IA;RU;In Russian)
Galadima, S.A., Contribution to the chemical and environmental isotopic study of the dallol Bosso acquifers (Niger), 20:8481 (RA;XA;In French)
Galen, P.S., *See* Fang, J.M., 20:7863
Galicia, Y., *See* Arellano, J., 20:7744
See Francois, J.L., 20:7645
Gallien, D., *See* Helble, J.J., 20:7175
Galloway, E., *See* Rockey, J.M., 20:7108
Ganev, I.K., *See* Orlov, V.V., 20:7355
Gangrskij, Yu.P., Microtron MT-25. Workshop on application of microtrons in nuclear physics, 20:8288 (I;RU;In Russian)
Photofission of nuclei at low excitation energies, 20:8918 (IA;RU;In Russian)
Study on the photonuclear reactions with alpha particles and cluster emission in the region of giant dipole resonance, 20:8922 (IA;RU;In Russian)
See Anastasov, A., 20:8863
See Kondev, F.G., 20:8920
Gangrsky, Yu.P., *See* Belov, A.G., 20:8923
Gangwal, S.K., *See* Jothimurugesan, K., 20:7109
Ganina, S.M., *See* Boltenko, Eh.A., 20:7699

Garbagnati, E., Current distribution and indirect effects on a wind power generator following a lightning stroke, 20:7616 (RA;DK)
Lightning tests on windmill blades, 20:7618 (RA;DK)
See Celi, O., 20:7625
See Dellera, L., 20:7617
Garbesi, K., Toward resolving model-measurement discrepancies of radon entry into houses, 20:8460 (R;US)
Garcia, F., *See* Simpson, R.L., 20:8111
Garcia-Flores, M., *See* Rodriguez-Gonzalez, E., 20:8159
Gardiner, K., Workshop on identification of transcribed sequences. Final report, August 15, 1993–August 14, 1994, 20:8583 (R;US)
Gareev, F.A., *See* Strokovsky, E.A., 20:8926
Garner, F.A., *See* Greenwood, L.R., 20:8105
Gass, W.R., *See* McLaughlin, D.F., 20:7422
Gassmann, F., "Abrupt change" scenarios. Global scenarios revisited with respect to emerging scientific insights, 20:7891 (RA;CH)
See Pillet, G., 20:7890
Gates, T., *See* Suuberg, E.M., 20:7087
Gauglitz, P.A., Six-phase soil heating for enhanced removal of contaminants: Volatile organic compounds in non-arid soils integrated demonstration, Savannah River Site, 20:7486 (R;US)
Gaye, C.B., *See* Tandia, A.A., 20:8479
Gayer, A., *See* Baran, A., 20:8588
Ge Zhigang, *See* Su Zhongdi, 20:8843
Geckeis, H., *See* Grambow, B., 20:8126
Gee, J.M., Reflectance control for multicrystalline-silicon photovoltaic modules using textured-dielectric coatings, 20:7591 (R;US)
The effect of encapsulation on the reflectance of photovoltaic modules using textured multicrystalline-silicon solar cells, 20:7592 (R;US)
See Basore, P.A., 20:7589
See King, R.R., 20:7594
Gehrbish, Sh., *See* Baatarkhuu, D., 20:8292
Gektin, A., *See* Moses, W.W., 20:8392
Gelb, A., *See* Pigeaud, A., 20:7931
Geller, A.S., *See* Rader, D.J., 20:8149
Gemmen, R.S., *See* Richards, G.A., 20:8266
Gemperle, C., *See* Schreiber, G.A., 20:8600
Gentry, M.S., *See* Lujan, R.D., 20:8106
Georgiev, G.P., *See* Grigor'ev, Yu.V., 20:8854
German, U., *See* Levinson, S., 20:8362, 20:8363, 20:8364, 20:9190
See Pelled, O., 20:8361
Gerster, D., Industrial reprocessing and recycling in France: An effective plutonium management method, 20:7267 (RA;XA)
Gettelfinger, G., *See* Ono, M., 20:9086
Geyer, H.K., *See* Krumpelt, M., 20:7924, 20:7927
Geyer, R., *See* Hamann, N., 20:8819
Ghafoori, N., *See* Chugh, Y.P., 20:7153
Ghasemi Zaad, A., The boiling water reactor transfer function studies by non-linear dynamical equations, 20:7646 (IA;IR;In English, Persian)
Ghazanfari, R., *See* Wahlroos, H., 20:7106
Giberkhteerman, A., Characteristics of secondary electron emission from CsI induced by X rays with energies up to 100 keV, 20:8993 (RA;IL)
Giberkhterman, A., *See* Lifshitz, Y., 20:8407
Gibson, J.A., *See* Pool, K.N., 20:7398
Gieci, A., NPPO - TINA: Expert system for supporting the operator's decision-making process, 20:7718 (RA;XA)
Gierman, S.M., *See* Nguyen, D.C., 20:8294
Gil, Choong Sup, *See* Kim, Jung Do, 20:9168
Gilabert, J.E., *See* Jimenez, A., 20:7726
Gilbert, E.R., Evaluation of storing Shippingport Core II spent blanket fuel assemblies in the T Plant PWR Core II fuel pool without active cooling, 20:7666 (R;US)
Gilibert, M., *See* Ron, S., 20:8661
Gill, R.L., *See* Wolf, A., 20:8856
Gillbert, M., Three-dimensional quantum mechanical study of exothermic reactive systems ($F+H_2$; $Ar+h^+_2$) employing imaginary arrangement decoupling potentials, 20:8183 (RA;IL)
Gillham, T., West Hackberry tertiary project. Quarterly technical progress report, September 3, 1994–December 2, 1994, 20:7219 (R;US)
Gillham, T.H., West Hackberry Tertiary Project. Quarterly technical progress report, June 3, 1994–September 2, 1994, 20:7218 (R;US)
Gimenez, J., *See* Grambow, B., 20:8126
Giroult-Matlakowski, G., *See* Cuevas, A., 20:7590
Glaessner, U., 24-th Order high temperature expansion for the 3-d Ising model, 20:8712 (R;US)
Glagolev, V.V., Final State Interactions in ^{3}Hep-Collisions, 20:8934 (R;XJ;In Russian)
See Gaitinov, A.Sh., 20:8924
Glagoleva, N.S., *See* Aksinenko, V.D., 20:8387
Glass, S.J., *See* Turman, B.N., 20:8130
Glasser, M.L., Relativistic non-interacting electron gas in a magnetic field, 20:9025 (R;AU)
See Kowalenko, V., 20:8708
Glassley, W.E., *See* Bruton, C.J., 20:7365
Glazer, A.A., *See* Prilepo, V.L., 20:8090
Glazov, O.N., *See* Adamov, E.O., 20:7722
Gleiter, H., *See* Wang, J., 20:8971
Glenn, D.R., *See* Baker, B.S., 20:7938
Glicken, J., *See* Fairbrother, A., 20:7866
Glore, D., *See* Kaupanger, R.M., 20:9189
Godwin, D.S., *See* Szymurski, S.R., 20:8432
Goeller, B., Mechanical loads on the RPV, 20:7801 (RA;DE)
See Dolensky, B., 20:7810
Goetzmann, O., The FPT O experiment of the Phebus project, 20:7814 (RA;DE;In German)
Goffeney, N., *See* Li, H., 20:8304
Gohil, P., *See* Luce, T.C., 20:9048
Goldemberg, J., Energy and sustainability: a global view, 20:7835 (IA;CH)
Goldman, P., *See* Thresher, R.W., 20:7620
Goldner, F.S., Energy use and domestic hot water consumption - Phase 1. Final report, 20:7986 (R;US)
Gollahalli, S.R., Combustion of pulverized coal in vortex structures. Quarterly progress report number 4, July 1–September 30, 1994, 20:7177 (R;US)
Goloskokov, S.V., Spin Effects in pp-Scattering at Diffraction Range and RHIC Energies, 20:8800 (R;XJ)
Golovanev, V.E., Use of interview and inquiry procedures in design process for NPP control room upgrade, 20:7733 (RA;XA)
Golovanov, V.V., *See* Dounaev, V.G., 20:7720
Golovin, V.M., Hybrid discriminator for microstrip silicon detectors, 20:8368 (R;RU;In Russian)
Golshani, A., Toponium energy levels, 20:8834 (IA;IR;In English, Persian)
Golutvin, I., *See* Cheremukhin, A., 20:8378
Gomaa, M.A., *See* Abdelfattah, A.T., 20:8454
Gomez C, M.T., Effects of arsenic upon the no-disyuntion and X chromosome loss mechanisms in Drosophila melanogaster., 20:8616 (I;MX;In Spanish)
Gomez, P., Mobile units to hydro geochemistry characterization, 20:8474 (R;ES;In Spanish)
Goncharova, V.A., *See* Smirnov, L.S., 20:9009
Gonfiantini, R., *See* Aranyossy, J.F., 20:8478
Gonsalves, E., Report of clean out and flushing of UO_3 Plant processing equipment: Revision 1, 20:7492 (R;US)
Gonzalez, J.A., Bifurcations and chaos of DNA solitonic dynamics, 20:8697 (R;XA)
Gonzalez, P., *See* Azorin, J., 20:8373
Goodhead, D.T., *See* Casarett, G.W., 20:8627
Goodman, M., *See* Crane, D., 20:8823
Goodman, P., Polarisation resonance in X-ray diffraction, 20:8990 (R;AU)
See Murphy, J.E., 20:8686
Gordeeva, G.V., Study of nitrided titanium, 20:8091 (IA;RU;In Russian)
Gordon, R., *See* Bjoerklund, N.K., 20:8571
See Gee, J.M., 20:7591
Gorelov, A.I., SPDS development for an RBMK unit, 20:7727 (RA;XA)
See Golovanev, V.E., 20:7733
Goresnic, C., *See* Baran, A., 20:8588
Goretta, K.C., *See* Guo, J., 20:8113
Gorozhankin, V.M., *See* Sehrehehtehr, Zh., 20:8383

Goryaga, N.G., *See* Romanovskij, E.A., 20:8986
Gotra, Yu.N., *See* Afanas'ev, S.V., 20:8376
Gottesfeld, S., *See* Rudge, A.J., 20:7832
Gottlieb, A., NYU Ultracomputer project. Final project summary, 1979-1993, 20:9161 (R;US)
Gourcy, L., Comment on the isotopic measures of Niger in Banankoro and of Bani in the Douna-San region, 20:8535 (RA;XA;In French)
Gousheh, S.S., Vacuum polarization by solitons in (1+1) dimensions, 20:8761 (IA;IR;In English, Persian)
Gove, R.M., *See* Arendt, J.W., 20:7282
Govett, R.L., *See* Folk, R.L., 20:7539
Goyet, C., *See* Dickson, A.G., 20:8544
Grabowski, H.U. von, *See* Schreiber, G.A., 20:8600, 20:8601
Grambow, B., Long-term safety of radioactive waste disposal: Reaction of high burnup spent fuel and UO_2 in saline brines at room temperature, 20:8126 (R;DE)
Gratson, D.A., *See* Nimlos, M.R., 20:8462
Gray, J.A., *See* Paul, P.H., 20:8963
Gray, K.E., *See* Zasadzinski, J., 20:8117
Green, D.W., Improving reservoir conformance using gelled polymer systems. Quarterly progress report, July 1–September 30, 1994, 20:7207 (R;US)
Greenberg, D.S., Physical mapping in the presence of errors: The chimeric clones problem, 20:8576 (RA;US)
Greene, D.L., Transportation Energy Efficiency Trends, 1972–1992, 20:8017 (R;US)
Greene, G.A., *See* Tutu, N.K., 20:8638
Greene, N.M., *See* Ingersoll, D.T., 20:7648
Greenwood, L.R., Calculation of transmutation in copper and comparison with measured electrical properties, 20:8105 (R;US)
Gribble, R.F., *See* Yapuncich, M.L., 20:9176
Gribov, I.V., *See* Alimov, A.S., 20:8921
Griffin, C.J., Associators in generalized octonionic maps, 20:8683 (R;AU)
See Kieu, T.D., 20:8774
Grigg, M.W., The use of a CCD imaging system for X-ray film intensity measurement, 20:8331 (R;AU)
Grigg, R.B., Improved efficiency of miscible CO_2 floods and enhanced prospects for CO_2 flooding heterogeneous reservoirs. Quarterly technical progress report, April 14, 1994–June 30, 1994, 20:7220 (R;US)
Improved efficiency of miscible CO_2 floods and enhanced prospects for CO_2 flooding heterogeneous reservoirs. Quarterly technical progress report, July 1, 1994–September 30, 1994, 20:7221 (R;US)
Grigor'ev, V.V., Computerized simulation of rare gas ion implantation in polymer materials, 20:9006 (IA;RU;In Russian)
Grigor'ev, Yu.V., Neutron resonance spin determination by the shape of capture gamma-quanta multiplicity spectrum, 20:8854 (R;RU;In Russian)
Grinchenko, A.Yu., Energy dependence of radiation yield of resonance nuclear reactions prompted by channeled protons in axial and plane channels of Nb-N_x and Re-C_x systems, 20:8946 (IA;RU;In Russian)
Groberg, W.J., *See* Keefe, M.L., 20:7576
Groebner, R.J., Evidence for modified transport due to sheared E x B flows in high-temperature plasmas, 20:9049 (R;US)
See Luce, T.C., 20:9048
Gromme, T., *See* Hendrickson, L., 20:8308
Gromnitskaya, E.L., *See* Smirnov, L.S., 20:9009
Gromov, K.Ya., *See* Sehrehehtehr, Zh., 20:8383
See Usmanov, P.N., 20:8865
See Veselov, G.V., 20:8382
Gropp, W., Scalable, extensible, and portable numerical libraries, 20:9153 (R;US)
Users guide for the ANL IBM SP1, 20:9154 (R;US)
Grossberg, P., *See* Hendrickson, L., 20:8308
Grossman, J.W., *See* Wendelin, T.J., 20:7599
Groves, F.R., *See* Lopez, A., 20:7107
Grundfelt, B., Radioactive waste in the Russian Federation, 20:7362 (R;SE)
Gu Fuhua, *See* Zhou Delin, 20:8893
Guarino, V., *See* Fornek, T., 20:8340
Guarino, V.J., *See* Hill, N.F., 20:8341
Guchait, M., *See* Datta, A., 20:8831
Gudbjerg, E., Energy consumption in the primary agricultural activities. Branch analysis, 20:8029 (R;DK;In Danish)
Guen, Tae Soon, *See* Chang, Won Pyo, 20:7664
Guerard, C.K., *See* Barabash, A.S., 20:8870
Guerre, A., *See* Sidoro, M., 20:8482
Guetta, V., *See* Weininger, J., 20:8587
Guigo, R., *See* Fickett, J.W., 20:8575
Gullinger, T.R., *See* Chason, E., 20:8145
Guin, J.A., Configurational diffusion of asphaltenes in fresh and aged catalyst extrudates. Quarterly progress report, 20 June 1994–20 September 1994, 20:7133 (R;US)
Guldamashvili, A.I., Mechanical properties of ion-alloyed boron-bearing materials, 20:8095 (IA;RU;In Russian)
Gummow, R.J., *See* Thackeray, M.M., 20:7829
Gundersen, P., Reasonably-priced low energy houses - heat recovery. New, simple system for residential ventilation, 20:7984 (R;NO;In Norwegian)
Guntau, A., Development and testing of new methods for prevention and suppression of spontaneous combustion fires in coal mining. Final report, 20:7164 (R;DE)
Guo Hanying, Equivalence of two non-commutative geometry approaches, 20:8723 (R;XA)
Guo Qingzhou, *See* Wen Ximent, 20:8152
Guo Yuhua, *See* Wang Xiuzhen, 20:8610
Guo, J., Effects of Bi and Bi_2O_3 additions on the microstructure and superconducting properties of powder-in-tube BSCCO (2212) tapes, 20:8113 (R;US)
Gupta, R., Chiral limit of QCD, 20:8768 (R;US)
Gurarie, V.N., Ion implantation and thermal stress resistance of ceramics, 20:8132 (R;AU)
Synthesis of carbo-nitride films using high-energy shock plasma deposition, 20:8134 (R;AU)
Gusakov, G.A., *See* Novikov, A.P., 20:8997, 20:8998
Guseva, M.I., *See* Gordeeva, G.V., 20:8091
Gustafson, G., *See* Olsson, Olle, 20:7359
Gutell, R.A., *See* Konings, D.A.M., 20:8558
Guth, M.A.S., *See* Clapp, R.B., 20:7471
Gutierrez, A., *See* Azorin, J., 20:8373
See Romero Juarez, M. A., 20:8204
Guul-Simonsen, F., *See* Gudbjerg, E., 20:8029
Guziel, K.A., *See* VanKuiken, J.C., 20:7904
Gyenes, G., A severe accident simulator for the Paks Nuclear Power Plant, 20:7734 (RA;XA)

H

Ha Huy Bang, Generalized deformed para-Bose oscillator and its coherent states, 20:8695 (R;XA)
Ha Jaejoo, A model based diagnostic system for the identification of malfunctioning components using a constraint propagation paradigm, 20:7728 (RA;XA)
Ha, Jae Joo, *See* Park, Chang Kyu, 20:9171
Ha, Jae Ju, *See* Park, Chang Kyu, 20:9170
Ha, Jang Ho, *See* Chae, Jong Seo, 20:8325
Ha, Kyui Seok, *See* Chang, Won Pyo, 20:9169
Ha, Y.J., *See* Park, Y.J., 20:8047
Haahr Joergensen, K., *See* Jensen, P.A., 20:7558
Haber, S.B., Organizational factors and nuclear power plant safety, 20:7780 (R;US)
Habib, S., Statistical mechanics of nonlinear coherent structures: Kinks in the Φ^6 model, 20:8704 (R;US)
Habibi, M.F., *See* Kamali Moghadam, K., 20:8945
Hadermann, J., Trends in safety assessment of radioactive waste repositories, 20:7295 (IA;CH)
Haeffner, D.R., *See* Job, P.K., 20:8298
Haemeri, K., Report series in aerosol science, 20:8437 (R;FI)
See Ahonen, T., 20:8444
Haerkoenen, M., Heat transfer and hydrodynamics of falling liquid films, 20:8260 (R;FI)
Hagen, G., Joint-project transport control system. Sub-project: Set-up of a material flow control with integration into the district control center's infrastructure. Final report, 20:7162 (R;DE)

Hagen, S., *See* Hofmann, P., 20:7793, 20:7812
Hagerty, K.J., Acceptance test procedure for the 340-NT-EX stack upgrades. Project W-337, 20:7457 (R;US)
Operability test procedure for the 340-NT-EX stack upgrades – Project W337, 20:7458 (R;US)
Haghighat, H., B to D and D to K semileptonic weak decay form factors, 20:8795 (IA;IR;In English, Persian)
Haghighat, M., *See* Azakov, S., 20:8701
Hah, Yeong Joon, *See* Kim, Se Chang, 20:7658
Hahm, T.S., Flow shear induced fluctuation suppression in finite aspect ratio shaped tokamak plasma, 20:9087 (R;US)
Hailfinger, G., *See* Goeller, B., 20:7801
Haites, E.F., Portfolio analysis model of climate change decision making, 20:7899 (RA;CH)
Hajek, B.K., *See* Ha Jaejoo, 20:7728
Hakam, O.K., Measurement of volumic activities of radon in air in houses and in working rooms with solid state nuclear track detectors, 20:8452 (I;MA;In French)
Halbleib, J.A., *See* Turman, B.N., 20:8130
Hall, J.L., *See* Lee, S.A., 20:8754
Halova, J., Applications of multicriteria decision making methods in Czech nuclear energetics, 20:7318 (IA;CZ)
Ham, Chang Shick, *See* Kwon, Kee Choon, 20:8337
Ham, Chang Shik, The establishment of master plan for developing advanced I and C technology -The development of advanced instrumentation and control technology-, 20:8336 (R;KR;In Korean)
Ham, Cheol Hoon, *See* Choi, Young Myung, 20:9143
Ham, Chol Hoon, *See* Oh, Keun Bae, 20:9141
Ham, Chul Hoon, *See* Kim, Hwa Sup: Yang, Maeng Ho, 20:7883
See Yang, Maeng Ho, 20:9140
Hamann, N., CP violation in hyperon decays: the case p-bar p → Λ-bar Λ → p-bar π^+ pπ^-, 20:8819 (R;AU)
Hamby, D.M., Verification of the MAXIGASP and POPGASP Computer Codes for Environmental Dose Assessment, 20:7460 (R;US)
Hamilton, R.T., Photon-charm production in p$\bar{p}$ collisions at $\sqrt{s}$ = 1.8 TeV, 20:8786 (R;US)
Hamilton, S., *See* VanKuiken, J.C., 20:7904
Hammermeister, D.P., *See* Blout, D.O., 20:7366
Hammett, G.W., *See* Beer, M.A., 20:9085
Hamming, R.W., Science is in the eye of the beholder, 20:8551 (RA;US)
Hamva, I., *See* Adorjan, F., 20:7713
Han Guoping, *See* Chang Chaohsi, 20:8790
Han Ming, *See* Luo Chenglin, 20:9028
Han, Chang Hee, *See* Kuk, Il Hiun, 20:8101
Han, Do Hee, *See* Chang, Won Pyo, 20:9169
Han, Eun Sook, *See* Kang, Sin Bok, 20:9144
Han, Heon Soo, *See* Kim, Jae Rok, 20:8602
Han, Hyun Soo, *See* Kim, Jae Rok, 20:7519
Han, Jae Joo, *See* Yoo, Keon Joong, 20:7657
Han, Jae Min, *See* Lee, Jong Min, 20:7516, 20:8231
Han, Jeon Geon, *See* Choi, Byung Ho, 20:9011
Han, Jeong Ho, *See* Kim, Uh Chul, 20:8264
Han, Kwang Hee, *See* Kim, Jae Rok, 20:7519
Han, Kwang Soo, *See* Chung, Chong Eun, 20:8390
See Moon. Byung Soo, 20:7749
Han, Kwang Su, *See* Park, Kwang Hyun, 20:8617
Han, Moon Hee, Development of a Real-Time radiological dose assessment system - A study on the radiation and environmental safety -, 20:8620 (R;KR;In Korean)
See Kim, Byung Woo, 20:9142
See Lee, Young Bok, 20:7754
See Shu, Kyung Suk, 20:7757
Han, Pil Soon, *See* Choi, Young Myung, 20:9146
Han, S.B., *See* Shin, D.Y., 20:8237
Han, S.O., *See* Yang, J.H., 20:7830
Han, Sang Hoon, *See* Park, Chang Kyu, 20:9171
See Yoo, Keon Joong, 20:7657
Hanan, N.A., *See* Bretscher, M.M., 20:7763
Hancock, E., *See* Carlisle, N., 20:7586
Hangarter, R., The fifth international conference on Arabidopsis research, 20:8597 (R;US)
Hanlkoi, A., *See* Fofana, A., 20:8533
Hansen, R., *See* Strand, T., 20:7598
Hansen, W.R., *See* Ferenbaugh, R.W., 20:7477
Hao Ballin, *See* Zhang Shuyu, 20:8490
Hara, Toshitsugu, Thermoacoustic refrigeration and acoustic compression, 20:7998 (RA;US)
Harb, J.N., Investigation of mineral transformations and ash deposition during staged combustion. Quarterly technical progress report, July 1–September 30, 1994, 20:7178 (R;US)
Hargrove, W.W., *See* Levine, D.A., 20:7483
Hari, P., *See* Ahonen, T., 20:8444
See Vesala, T., 20:8438
Harley, P.C., *See* Reynolds, J.F., 20:8569
Harmon, H.D., High-level waste management technology program plan, 20:7315 (R;US)
Harn, Deuck Haing, *See* Lee, Ji Ho, 20:9192
Harnevie, H., *See* Baeckstroem, S., 20:7867
Harris, B., *See* McRae, D., 20:8497
Harris, B.A., Top quark and Higgs boson masses from wormhole physics, 20:8841 (R;AU)
Two-loop vacuum amplitudes in a non-Abelian gauge theory on S_4, 20:8743 (R;AU)
Harris, B.W., *See* Haywood, W., 20:8420
Harris, I.R., *See* Moreno, D., 20:8084
Harris, R.E., Implementing the theories: A fully integrated project control system that's implemented and works, 20:9132 (R;US)
Harrison, D.P., A calcium oxide sorbent process for bulk separation of carbon dioxide, 20:7102 (R;US)
See Lopez, A., 20:7107
Hart, T.R., *See* Schmidt, A.J., 20:7351
Hartman, F.C., *See* Roberto, J.B., 20:7876
Hartmann, I., *See* Ivanda, M., 20:8992
Hasan, S., *See* Aziz, A., 20:7778
Hasany, S.M., *See* Qureshi, R.M., 20:7161
Haschke, J.M., Hydrolysis of plutonium: Corrosion kinetics in DMSO solutions containing simulated high explosive and water, 20:8421 (R;US)
Hasegawa, Y., A search for jet handedness in hadronic Z^0 decays, 20:8814 (R;US)
Hasemann, I., *See* Axmann, A., 20:7785
See Benz, G., 20:7816
Hashem, S., *See* Kangas, L.J., 20:7453
Hass, M., *See* Barak, J., 20:8406
See Levinson, J., 20:8404
Hatcher, P.G., *See* Schobert, H.H., 20:7247
Hatcher, R., *See* Ono, M., 20:9086
Hatrick, K., Coordinated changes in protein multiple sequence alignments, 20:8556 (RA;US)
Hautanen, J., Electrical agglomeration of aerosol particles, 20:8441 (RA;FI)
See Lehtinen, K.E.J., 20:8440
See Ylaetalo, S.I., 20:7150
Hawley, M., *See* Szymurski, S.R., 20:8432
Haxton, W.C., *See* Bruggen, M., 20:8688
Hayden, A.C.S., Canadian R&D on oil-fired combustion systems, 20:7950 (RA;US)
Hayes, M.C., *See* Keefe, M.L., 20:7576
Haynes, T.E., *See* Ivanda, M., 20:8992
Haywood, W., An assessment of high-energy explosives and metal contamination in soil at TA-67 (12), L-Site, and TA-14, Q-Site, 20:8420 (R;US)
See McRae, D., 20:8497
Hazak, G., Generalized Van Cittert Zernike theorem in curved space time, 20:8664 (RA;IL)
Radiation transport and coherence in amplifying refractive systems, 20:8662 (RA;IL)
The Wolf effect in spherically symmetric systems, 20:8665 (RA;IL)
See Levron, D., 20:8954
See Zahavi, O., 20:8663
He Fuqing, *See* Peng Xiufeng, 20:8905
He Zhongliang, Post accident core damage assessment methodology and code, 20:7651 (R;CN;In Chinese)
He, X.G., *See* Hamann, N., 20:8819
Headley, T.J., *See* Chason, E., 20:8145
Hearty, C., *See* Aston, D., 20:8401

Hebert, M., Preservation theorems on finite structures, 20:8693 (R;XA)
Hedden, R., Update on the build with oil program and the oilheat manufacturers association, 20:7949 (RA;US)
Hedengren, D.C., *See* Gilbert, E.R., 20:7666
Hediger, W., On the opportunity cost of climate change and policy, 20:7894 (RA;CH)
Hedin, B., Tracer gas measurement techniques. Active methods to identify volumes, air flows, flow paths and flow patterns in single family houses, 20:7983 (R;SE;In Swedish)
Helland, R.W., Object-oriented parallel polygon rendering, 20:9186 (R;US)
Heilig, E., *See* Dillmann, H.G., 20:7808
Heimbuerger, H., *See* Jaervinen, J., 20:7632
Hein, K.R.G., *See* Nykaenen, J., 20:7141
Hein, N., *See* Guntau, A., 20:7164
Heinemann, K., Measuring program of the Federal Republic of Germany. Results of environmental measurement in Russia, Byelorussia and Ukraine in the time from May 17 to September 2, 1993, and from October 8 to November 1, 1993, 20:8496 (R;DE;In German)
Heinle, R., *See* Hudson, B., 20:8426, 20:8427
Heiser, J.H., Subsurface barrier verification technologies, informal report, 20:7290 (R;US)
Hejmanowski, R., The pre-calculation of ground subsidence due to extraction above petroleum and natural gas deposits, 20:7241 (R;DE;In German)
Helble, J.J., Fundamental study of ash formation and deposition: Effect of reducing stoichiometry. Quarterly report No. 6, 1 July–30 September 1994, 20:7175 (R;US)
See Sarofim, A.F., 20:8439
Helle, N., *See* Schreiber, G.A., 20:8600, 20:8601
Heller, J.P., *See* Grigg, R.B., 20:7220, 20:7221
Hellman, M.H., De-aeration of feedwater by membrane-technique, 20:8177 (R;SE;In Swedish)
Helmich, D.R., *See* Turman, B.N., 20:8130
Helton, B.D., *See* Whitehouse, J.C., 20:7432
Helton, J.C., Uncertainty and sensitivity analysis of chronic exposure results with the MACCS reactor accident consequence model, 20:7820 (R;US)
Uncertainty and sensitivity analysis of early exposure results with the MACCS Reactor Accident Consequence Model, 20:7821 (R;US)
Uncertainty and sensitivity analysis of food pathway results with the MACCS Reactor Accident Consequence Model, 20:8509 (R;US)
Hemer, M., A new monitoring network in the surroundings of old uranium mine spoil banks in the Pribram district sites, 20:8453 (IA;CZ;In Czech)
Henderson, C.L., *See* Anderson, R.E., 20:8222
Hendricks, J.S., *See* Court, J.D., 20:8948, 20:8949
Hendrickson, L., Tutorial on beam-based feedback systems for linacs, 20:8308 (R;US)
Henestroza, E., *See* Li, H., 20:8304
Henneck, R., *See* Levinson, J., 20:8404
Henneges, G., Application of the CONTAIN code to LWRs, 20:7811 (RA;DE;In German)
Hennig, D., *See* Saphier, D., 20:7667
Hepola, J., Usability of catalytic gas cleaning in a simplified IGCC power system. Deactivation of Ni/Al_2O_3 catalysts. Literature review, 20:7640 (R;FI)
Hepworth, M.T., Hot coal gas desulfurization with manganese-based sorbents. Final report, September 1992–December 1994, 20:7104 (R;US)
Hot coal gas desulfurization with manganese-based sorbents, 20:7105 (R;US)
Herbes, S.E., *See* Watkins, D.R., 20:7298
Heringa, J., A method to recognize distant repeats in protein sequences, 20:8557 (RA;US)
Herman, H., *See* Varacalle, D.J. Jr., 20:8129
Herman, R.G., *See* Klier, K., 20:7564
Hermansson, H.P., Chemistry in water reactors, 20:8219 (R;SE;In Swedish)
Hermes, W.H., *See* Salmon, R., 20:7336
Hernandez Benitez, A., Study of isotopic desequilibrium of natural radioactive series in granitic environment: Pluton of El Berrocal (Toledo), 20:8475 (R;ES;In Spanish)
Hernberg, R., *See* Stenberg, J., 20:7185
Herrera, M.N., Further studies of the effects of oxidation on the surface properties of coal and coal pyrite, 20:7144 (R;US)
Herrick, T.J., *See* DeVore, J.R., 20:7484
Herrmann, B., *See* Dayan, D., 20:8087
Herrmann, G.H., Aerogels - a foam alternative, 20:7991 (RA;US)
Herrmann, H.W., *See* Zweben, S.J., 20:9088
Hersant, D., Study of point defects and matter transport in cubic face centered concentrated alloys, 20:8073 (R;FR;In French)
Hertzog, D., *See* Hamann, N., 20:8819
Herwig, L.O., *See* Witt, C.E., 20:7596
Hess, A.L., CSER 94-014: Storage of metal-fuel loaded EBR-II casks in concrete vault on PFP grounds, 20:8245 (R;US)
Hess, B.V., *See* Anz, S.J., 20:8176
Hess, R.A., *See* Adkisson, B.P., 20:9149
Hesse, U., Air cycle air conditioning and the use of ammonia in supermarket refrigeration systems, 20:8005 (RA;US)
Hesselbach, I.J., *See* Beddies, H., 20:8036
Hester, R., *See* McCormick, C., 20:8180
Heusener, G., Actinide burning in fast reactors. KfK contributions to the CAPRA code, 20:7321 (RA;DE;In German)
The R and D program of the Nuclear Safety Research Project, 20:7790 (RA;DE;In German)
Hewett, J.L., Probing new physics in rare charm processes, 20:8818 (R;US)
Hewlett, K.J., *See* Cicero, C.A., 20:7429
Hicks, M., *See* Martino, A., 20:8194
Hietala, V.M., *See* Kravitz, S.H., 20:8277
Higinbotham, W.A., Material unaccounted for at the Southwest Experimental Fast Oxide Reactor: The SEFOR MUF, 20:7764 (R;US)
Hilbert, D.W., *See* Reynolds, J.F., 20:8569
Hildebrand, R.A., *See* Brown, M.J., 20:7383
Hildebrand, S.G., *See* Roberto, J.B., 20:7876
Hildreth, M.D., A test of the flavor independence of strong interactions, 20:8808 (R;US)
Hill, J.L. III, *See* Hutzel, W.J., 20:8416
Hill, K.W., Design studies for ITER x-ray diagnostics, 20:9082 (R;US)
Hill, N.F., Support girder design for the atlas hadron calorimeter, 20:8341 (R;US)
Hillamo, R., *See* Pakkanen, T., 20:8445
Hille, R., *See* Heinemann, K., 20:8496
Himel, T., *See* Hendrickson, L., 20:8308
Hinkins, R.L., Parallel computation of automatic differentiation applied to magnetic field calculations, 20:8302 (R;US)
Hinks, D.G., *See* Zasadzinski, J., 20:8117
Hippinen, I., *See* Jalovaara, J., 20:7183
Hirayama, H., *See* Nelson, W.R., 20:8950
Hirschberg, S., *See* Suter, P., 20:7844
Hirschon, A.S., Highly dispersed catalysts for coal liquefaction. Quarterly report No. 12, May 23, 1994–August 22, 1994, 20:7124 (R;US)
Hirtz, W., Environmental impact statements in research projects. The example of photovoltaic energy conversion. Vol. 1. Summary and results, 20:7597 (R;DE;In German)
Hitterman, R.L., *See* Shaked, H., 20:8083
Ho, Jong Hwa, *See* Kim, Huhn Jun, 20:8391
Ho, K., *See* Shiao, S.Y., 20:7098
Hoag, H.A., *See* Wang, J.W., 20:8328
Hoang Ngoc Long, Electromagnetic-gravitational conversion cross sections in external electromagnetic fields, 20:8757 (R;XA)
Hobbs, D.T., Characterization of high-level waste saltcake stored at the Savannah River Site, 20:7425 (R;US)
Hock, S.M., *See* Thresher, R.W., 20:7620
Hodgson, A.T., *See* Daisey, J.M., 20:8461
Hodgson, R.D., Storage options for Long Length Contaminated Equipment (LLCE) items, 20:7402 (R;US)
Hoegh Jensen, K., *See* Butts, M.B., 20:8506
Hoffman, A., *See* McCulloch, D.G., 20:9015
Hoffmann, G., *See* Goeller, B., 20:7801

Hoffmann, H., Studies of passive after-heat removal for fast reactors, 20:7791 (RA;DE;In German)
Hofman, G.L., Comparison of irradiation behavior of different uranium silicide dispersion fuel element designs, 20:7698 (R;US)
See Suripto, A., 20:7762
Hofmann, F., *See* Lister, J.B., 20:9072
Hofmann, P., Compatibility of graphite with a martensitic-ferritic steel, an austenitic stainless steel and a Ni-base alloy up to 1250 C, 20:9108 (R;DE)
CORA results concerning LWR fuel element behaviour in the event of severe reactor accidents, 20:7793 (RA;DE;In German)
Experimental results of the CORA test program on the LWR fuel element behavior in severe reactor accidents, 20:7812 (RA;DE;In German)
Hofmayer, C.H., Understanding earthquake design criteria used in Japan, 20:7781 (R;US)
Hogg, R., *See* Parekh, B.K., 20:7137
Holby, O., *See* Evans, S., 20:8547
Hollander, M., *See* Arad, M., 20:7708
Hollenberg, C.L., *See* Feng, Xiaoping, 20:8957
Hollenberg, G.W., Salt splitting of sodium-dominated radioactive waste using ceramic membranes, 20:7347 (R;US)
See Slagle, O.D., 20:9124
Hollenberg, L.C.L., A general non-perturbative estimate of the energy density of lattice Hamiltonians, 20:8742 (R;AU)
Approximate analytic diagonalization of lattice QCD, 20:8773 (R;AU)
Beyond the variational principle in quantum field theory, 20:8749 (R;AU)
See Witte, N.S., 20:8741
Holm, D.D., *See* Alder, M.S., 20:9178
Holm, E.A., *See* Swiler, T.P., 20:8107
Holm, J., *See* Kirkegaard, C., 20:8504
Holt, V.L., WAG 2 remedial investigation and site investigation site-specific work plan/health and safety checklist for the sediment transport modeling task, 20:7481 (R;US)
WAG 2 remedial investigation and site investigation site-specific work plan/health and safety checklist for the ecological assessment task, Kingfisher Study, 20:7482 (R;US)
Holtzapple, R., *See* Decker, F.J., 20:8307
Holz, R., Hourly simulations of hybrid renewable energy systems for San Cristobal/Santa Barbara, Guatemala, 20:8049 (R;US)
Homann, C., *See* Sengpiel, W., 20:7815
Honea, R.B., *See* Roberto, J.B., 20:7876
Honekemp, J.R., *See* Beary, M.M., 20:7343, 20:7344
Hong, Bong Geun, *See* Hwang, Churl Kew, 20:9068
Hong, Bong Guen, *See* In, Sang Ryul, 20:9107
See Lee, Kwang Won, 20:9106
Hong, C.J, *See* Park, S.C., 20:7540
Hong, Gyee Won, Development of superconductor application technology -Advanced nuclear materials development-, 20:9038 (R;KR;In Korean)
Hong, Hyeong Pyo, *See* Park, Kwang Hyun, 20:8617
Hong, J.C., *See* Shin, H.S., 20:7977
Hong, Jong Sook, Technology development for nuclear material accountability, 20:7509 (R;KR;In Korean)
See Park, Hyeon Soo, 20:7510
Hong, Jun Hwa, A study on the irradiation effect on reactor materials using a cyclotron, 20:8263 (R;KR;In Korean)
Development of stainless steels for nuclear power plant - Advanced nuclear materials development -, 20:8099 (R;KR;In Korean)
Hong, Kwang Bum, *See* Yang, Kyung Rin, 20:7661
Hong, Kwang Hee, *See* Lee, Chang Woo, 20:8619
See Lee, Jeong Ho, 20:8622
Hong, Kwang Hui, *See* Lee, Jeong Ho, 20:8618
Hong, Kwang Pyo, *See* Suh, Doo Whan, 20:7771
Hong, S.H., A study on the performance evaluation technique of prefabricated Ondol(II), 20:7964 (R;KR;In Korean)
Hong, Seong Seok, *See* Chae, Jong Seo, 20:8325
Hong, Seong Wan, *See* Kim, Hee Dong, 20:9172
Hong, Soon Bok, *See* Hwang, Sung Tai, 20:7678
Hong, Soon Shin, *See* Lee, Sam Lai, 20:7660
Hong, Suk Boong, *See* Chung, Chong Eun, 20:8390
See Moon, Byung Soo, 20:7749
See Park, Kwang Hyun, 20:8617
Hong, Wan-Shick, Charged particle detectors based on high quality amorphous silicon deposited with hydrogen or helium dilution of silane, 20:8393 (R;US)
Honusek, M., *See* Adam, J., 20:8385
Hoo, E., *See* Carlisle, N., 20:7586
Horlo, M., Fine particle aspects of fluidized bed processes, 20:7184 (RA;FI)
Horowitz, Y.S., Study of the long term stability of peak 4 and 5 in the TLD-100 using computerized glow curve deconvolution and thermal peak isolation techniques. Correlation with isothermal decay measurements at elevated temperatures, 20:8350 (RA;IL)
Horton, P., *See* Moos, L.P., 20:7468
Horvath, A., *See* Wahlroos, H., 20:7106
Hoskin, D., Premium performance heating oil, 20:7955 (RA;US)
Hou Ruiqin, Study on the extraction of Am^{3+} and rare earth elements with β-oxime extractant (7804) (I), 20:8153 (R;CN;In Chinese)
Houck, T., *See* Li, H., 20:8304
Hourahan, G.C., *See* Szymurski, S.R., 20:8432
Howard, A.J., *See* Chason, E., 20:8145
Howard, B.J., Fire hazard analysis for the Westinghouse Hanford Company managed low-level mixed waste Trench 31 and 34, 20:7502 (R;US)
Howard, J.B., *See* Diaz, A.F., 20:7248
Howden, G.F., Tank Waste Remediation System tank waste pretreatment and vitrification process development testing requirements assessment, 20:7411 (R;US)
Howell, L., *See* Pember, R.B., 20:8220
Hoyt, E., *See* Fetzko, S., 20:8327
Hsuan, H., *See* Hill, K.W., 20:9082
Hu Yongming, Calculation of thermal neutron scattering law for anisotropic microcrystals, 20:8944 (RA;CN)
Huang Fuduan, Study on LOMI decontamination technology, 20:8609 (R;CN;In Chinese)
Huang Xiaolong, Progress on frequently useful nuclear decay data library, 20:8868 (RA;CN)
Huang Zhongfu, A new set of average level spacings for s-wave resonance, 20:8852 (RA;CN)
Huang Zuqia, *See* Chen Jinyu, 20:8700
Huang, Y., *See* Brooks, K.G., 20:8135
Huang, Zhirong, Radiation and radiation reaction in continuous focusing channels, 20:8326 (R;US)
Huber, F., Premix experiments, 20:7800 (RA;DE;In German)
Huber, R., Steam explosion, premixing experiments with solid spheres, 20:7802 (RA;DE;In German)
Huber, S., Study on the interaction of lithium orthosilicate with water vapor and hydrogen, 20:9122 (R;DE;In German)
Huber, W., *See* Hirtz, W., 20:7597
Hudson, B., HAZEBROOK, containment data report, 20:8427 (R;US)
KERNVILLE, containment data report, 20:8426 (R;US)
Huebner, W., Processing of $LaCrO_3$ for solid oxide fuel cell applications, 20:7929 (RA;US)
Hueper, R., Papers presented as part of the status report of the Nuclear Safety Research Project of the Karlsruhe Nuclear Center on 23 March 1994, 20:7788 (R;DE;In German)
Safety-related LWR research. Annual report 1993, 20:7798 (R;DE;In German, English)
Huffman, G.P., *See* Helble, J.J., 20:7175
Hugg, L.A., *See* McCabe, D.J., 20:7433
Huggins, F.E., *See* Helble, J.J., 20:7175
Huh, Chang Uk, *See* Rhee, Bo Wook, 20:7683
Huh, Hyung, *See* Cheong, Yong Moo, 20:8262
Huh, Young Hwan, *See* Kang, Shin Bok, 20:9167
See Kim, Jae Hui, 20:7748
Hull, J.R., *See* Niemann, R.C., 20:7826
Hund, T.D., *See* Gee, J.M., 20:7591, 20:7592
Hundal, T.S., 242-A Evaporator Condensate Tank (TK-C-100) tie down evaluation, 20:7499 (R;US)
242-A Evaporator ion exchange column (IX-D-1) tie down evaluation, 20:7391 (R;US)
Hunt, J., *See* Bernard, R., 20:7926
Hunter, B.A., *See* Shaked, H., 20:8083
Hunter, H.T., *See* Ingersoll, D.T., 20:7648
Hur, Do Haeng, *See* Kim, Uh Chul, 20:7694, 20:8264

Hurley, P., *See* Holz, R., 20:8049
Huston, J.J., Project Specific Quality Assurance Plan (QAPP), 20:7388 (R;US)
Hutzel, W.J., Innovative directional and position specific sampling technique. Phase 3: Final report, July 1992–September 1994, 20:8416 (R;US)
Hwang, Cheol Kyu, *See* Lee, Jong Min, 20:8293
Hwang, Chul Kew, *See* In, Sang Ryul, 20:9107
See Lee, Kwang Won, 20:9106
Hwang, Churl Kew, Development of plasma diagnostics technologies -A study on nuclear fusion reactor-, 20:9068 (R;KR;In Korean)
See Choi, Byung Ho, 20:9011
Hwang, Dae Hyun, *See* Lee, Jae Kyung, 20:7659
Hwang, Doo Seong, *See* Park, Jin Ho, 20:8621
See Yoo, Jae Hyeong, 20:8188
Hwang, In Koo, *See* Ham, Chang Shik, 20:8336
Hwang, Mi Jeong, *See* Kim, Dong Ha, 20:7756
See Park, Chang Kyu, 20:9171
Hwang, Seong Sik, *See* Kim, Uh Chul, 20:7694
Hwang, Seong Tae, *See* Chung, Heung Seok, 20:7517
Hwang, Suk Yeoung, *See* Kim, Seung Ho, 20:8236
See Lee, Jong Min, 20:8235
Hwang, Sung Chan, *See* Kang, Young Ho, 20:8100
Hwang, Sung Sik, *See* Kim, Uh Chul, 20:8264
Hwang, Sung Tai, A study on the safety measures of LMR coolant - Liquid metal reactor development-, 20:7678 (R;KR;In Korean)
Hwang, Tae Seok, *See* Chang, Won Pyo, 20:7664
Hwang, Wan, *See* Kim, Chang Kyu, 20:7772
See Rhee, Bo Wook, 20:7683
Hwang, Won Tae, *See* Han, Moon Hee, 20:8620
See Kim, Byung Woo, 20:9142
See Lee, Young Bok, 20:7754
See Shu, Kyung Suk, 20:7757
Hwang, Y.S., Exploration of low-aspect-ratio tokamak regimes in the CDX-U and TS-3 devices, 20:9089 (R;US)
Hwoang, Chang Kyue, *See* Kim, Seung Ho, 20:8230
Hwoang, Suk Yeoung, *See* Kim, Seung Ho, 20:8230

I

Ibrahim, A.S., *See* Abdelmalik, W.E.Y., 20:8539
Ifwarson, M., *See* Traenkner, T., 20:7256
Ignat'ev, A.S., *See* Petrova, A.G., 20:9003
Ignat, D.W., Hot-ion Bernstein wave with large $k_{parallel}$, 20:9080 (R;US)
Ignatenko, M.A., *See* Bojko, I.R., 20:8386
Ignatiev, A.Yu., The search for the decay of Z boson into two gamma as a test of Bose statistics, 20:8822 (R;AU)
Ihsanullah, ICP-MS as advantageous analytical technique for the determination of long-lived ^{99}Tc in the environment, 20:8173 (R;PK)
Il'ina, G.G., *See* Smirnov, L.S., 20:9009
Ilberg, D., Radiation tolerance of the Offec Leo satellites. Design-policy, ground testing and flight data evaluation, 20:8408 (RA;IL)
See Akkerman, A., 20:8405
See Barak, J., 20:8406
See Levinson, J., 20:8404
Imamura, M., *See* Shibata, S., 20:8160
In, Sang Ryeol, *See* Hwang, Churl Kew, 20:9068
In, Sang Ryul, The development of the tokamak system technology -A study on the fusior reactor-, 20:9107 (R;KR;In Korean)
See Lee, Kwang Won, 20:9106
Indacochea, J.E., *See* Krumpelt, M., 20:7925
Ingersoll, D.T., Production and testing of the VITAMIN-B6 fine group and the BUGLE-93 broad-group neutron/photon cross-section libraries derived from ENDF/B-VI nuclear data, 20:7648 (R;US)
Isaacs, H.S., *See* Vitus, C.M., 20:8072
Isayev, A.A., *See* Kovalevsky, M.Yu., 20:9023
Ishino, T., The role of neutron irradiation facilities, 20:9116 (IA;DE)
Ishishita, K., *See* Sano, H., 20:8157
Ishkhakov, B.S., *See* Alimov, A.S., 20:8921
Israeli, M., *See* Lifshitz, Y., 20:8407
Israr, M., *See* Qazi, M.K., 20:7759
Istrail, S., *See* Greenberg, D.S., 20:8576
Iszak, E., *See* Baran, A., 20:8588
Itoh, H., *See* Kuzin, A., 20:8940
Iturbe, J.L., Alpha-particle spectrum of ^{222} Rn and its daughters using silicon surface-barrier detectors., 20:8371 (IA;MX)
Ivanda, M., Raman study of damage processes in Si^+-implanted GaAs, 20:8992 (R;US)
Ivanov, A.A., *See* Davydenko, V.I., 20:9042
Ivanov, D.Yu., *See* Burichenko, A.P., 20:8966
Ivanov, M.P., *See* Kuznetsov, I.V., 20:8915
Ivanov, V.G., Automatized working place of the microtron MT-25 operator, 20:8321 (IA;RU;In Russian)
Ivanov, V.V., Algorithms for Events Selection in the Vertex Detector of the MPS Spectrometer, 20:9166 (R;XJ;In Russian)
Ivry, J., *See* Levron, D., 20:8954
Iwasaki, Yoshihito, A measurement of quark and gluon jet differences at the Z^0 resonance, 20:8807 (R;US)
Iz"yurov, V.M., *See* Abraamyan, Kh.U., 20:8936
Izen, J.M., Elementary particle physics. Progress report, July 1992–October 1994, 20:8784 (R;US)
Izrajlev, F.M., Statistical properties of chaotic scattering with one open channel, 20:8660 (R;RU)
Izumi, F., *See* Shaked, H., 20:8083

J

Jackowiak, M., *See* Kosmowski, K.T., 20:7642
Jacobs, G., Mechanical loads on internal containment structures, 20:7804 (RA;DE;In German)
Jacobs, H., Studies into steam explosion scenarios, 20:7795 (RA;DE;In German)
See Arnecke, G., 20:7803
Jacobs, S.J., Disilene Addition to C_{70}, 20:8193 (R;US)
Jacobsen, F., The development of a positron ionization gauge, 20:8415 (R;US)
Jacoby, W.A., *See* Nimlos, M.R., 20:8462
Jae, Moo Sung, *See* Park, Chang Kyu, 20:9170
Jaervinen, J., Experience of reliability of programmable control systems, 20:7632 (R;FI;In Finnish)
Jaffery, T.S., *See* Lee, S.A., 20:8754
Jalovaara, J., Particle emissions from pressurized fluidized bed combustion, 20:7183 (RA;FI)
James, R.A., *See* Luce, T.C., 20:9048
James, R.W., Natures refrigerant - propane, 20:8006 (RA;US)
Jameson, R.A., Self-consistent beam halo studies & halo diagnostic development in a continuous linear focusing channel, 20:8301 (R;US)
Jang, Deok Kyu, *See* Kang, Shin Bok, 20:9167
Jang, Ho Il, *See* Choi, Chang Beom, 20:7671
Jang, Hong Lae, *See* Choi, Young Myung, 20:9146
Jang, In Soon, *See* Yoon, Myoung Hwan, 20:8170
Jang, Jin Sung, *See* Kuk, Il Hiun, 20:8101
Jang, Seung Cheol, *See* Park, Chang Kyu, 20:9171
Jang, Shee Jeong, *See* Kim, Chang Kyu, 20:7772
Jansen, G. Jr., *See* Knutson, B.J., 20:7371
Jantzen, C.M., *See* Poulos, D.G., 20:7440
See Whitehouse, J.C., 20:7432
Jardine, L.J., *See* Bitz, D.A., 20:7364
Jasper, S.A. Jr., *See* McCabe, D.J., 20:7433
Javed, T., *See* Mashiatullah, A., 20:8545
See Qureshi, R.M., 20:7161
Je, Moo Seong, *See* Yoo, Keon Joong, 20:7657
Jeang, Jae Joon, *See* Chang, Won Pyo, 20:7664
Jejer, V.N., *See* Afanas'ev, S.V., 20:8376
Jenkins, B., *See* Baxter, L., 20:7560
Jenkins, N., Earthing of wind farms - a report of work in progress, 20:7619 (RA;DK)
Jennings, G., *See* Knapp, G.S., 20:8309
Jennings, J., *See* Turiel, I., 20:7982
Jensen, C.E., Inspection system performance test procedure, 20:7393 (R;US)
Jensen, G.F., Refining of fossil resin flotation concentrate from western coal. Seventh quarter final report, July 1, 1994–September 30, 1994, 20:7146 (R;US)

Jensen, J.R., *See* Bresnaham, P.J., 20:7503
Jensen, M.K., *See* Trewin, R.R., 20:8022
Jensen, P.A., Interview and literature study of combustion and deposition characteristics of straw, 20:7558 (R;DK;In Danish)
Jeon, Byeong Chil, *See* Kim, Huhn Jun, 20:8391
Jeon, Byeong Jin, *See* Kim, Jae Rok, 20:8602
Jeon, H.S., Standardization of direct and global solar radiation in Korea (II), 20:7966 (R;KR;In Korean)
Jeon, Hyeong Ryeon, *See* Cho, Man, 20:7677
Jeon, Hyong Ryon, *See* Kim, Yong, 20:9139
Jeon, Ji Soo, *See* Chung, Jang Hwan, 20:7670
Jeon, M.S., *See* Kang, Y.H., 20:7968
See Kim, D.H., 20:7973
See Lim, S.H., 20:7972
Jeon, Yeong Keon, *See* Lee, Ji Bok, 20:7774
Jeon, Yong Beom, *See* Park, Hyun Soo, 20:7672
Jeong, Beop Dong, *See* Seok, Ho Cheon, 20:7669
Jeong, Chang Joon, *See* Seok, Ho Cheon, 20:7669
Jeong, Do Young, *See* Lee, Jong Min, 20:8169, 20:8231, 20:8293
Jeong, Dong Yong, *See* Yoo, Jae Hyeong, 20:8188
Jeong, Eui Chang, *See* Lee, Jong Min, 20:7516, 20:8169
Jeong, Heung Joon, *See* Chung, Jang Hwan, 20:7670
Jeong, Hyeong Kook, *See* Sohn, Dong Seong, 20:7704
Jeong, Ji Yeong, *See* Hwang, Sung Tai, 20:7678
Jeong, Jong Tae, *See* Kim, Dong Ha, 20:7756
See Yoo, Keon Joong, 20:7657
Jeong, Keong Hoon, *See* Kim, Tae Ryong, 20:7692
Jeong, Ki Seok, *See* Lee, Jong Min, 20:8293
Jeong, Kwang Seop, *See* Yoo, Keon Joong, 20:7657
Jeong, Kyeong Chae, *See* Hwang, Sung Tai, 20:7678
Jeong, Moon Ki, *See* Chung, Jang Hwan, 20:7670
Jeong, Seong Hoon, *See* Choi, Chang Beom, 20:7671
Jeong, Seung Ho, *See* In, Sang Ryul, 20:9107
See Lee, Kwang Won, 20:9106
Jeong, Un Soo, *See* Lee, Ji Bok, 20:7774
Jeong, Wo, *See* Yoo, Keon Joong, 20:7657
Jeong, Won Dae, *See* Park, Chang Kyu, 20:9171
Jeong, Won Myeong, *See* Park, Jin Ho, 20:8621
Jeong, Yeong Uk, *See* Lee, Jong Min, 20:8232
Jeong, Yong Sam, *See* Kim, Jae Rok, 20:8602
Jeong, Yong Won, *See* Chung, Heung Seok, 20:7515
Jernigan, G.G., Carbon monoxide oxidation over three different states of copper: Development of a model metal oxide catalyst, 20:8063 (R;US)
Jetter, M., *See* Katsogiannis, A., 20:8821
Jezek, J., *See* Nemec, V., 20:9165
Ji, Dae Yeong, *See* Kim, Yong Seong, 20:7773
Ji, Young Hoon, Development of high energy radiation measurement system with diode, 20:8389 (R;KR;In Korean)
Jiang Hongtao, *See* Chang Chaohsi, 20:8790
Jiao Rongzhou, *See* Hou Ruiqin, 20:8153
Jimenez, A., Operation support systems in nuclear power plants. Diagnostic aids: Alarm logic systems, 20:7726 (RA;XA)
Jimenez, F., *See* Fernandez, M., 20:8156, 20:8315
Jimenez-Becerril, J., *See* Carrera, L.M., 20:8187
Jimenez-Dominguez, H., Approximated expression for the dispersion EPR profile., 20:8984 (IA;MX)
Jin, Jeong Tae, *See* Lee, Jong Min, 20:8293
Jin, Joon Ha, Operation of the irradiation facilities, 20:7522 (R;KR;In Korean)
Studies on radiation processing -Studies on application of radiation and radioisotopes-, 20:7523 (R;KR;In Korean)
See Kim, Jae Rok, 20:8602
Jin, Jun Ha, *See* Lee, Myeon Joo, 20:8211
Jin, Jung Tai, *See* Choi, Byung Ho, 20:9011
Jin, Yeong Ho, *See* Yoo, Keon Joong, 20:7657
Jing, Tao, *See* Hong, Wan-Shick, 20:8393
Jo, D.K., *See* Jeon, H.S., 20:7966
Jo, Hae Dong, *See* Kim, Chang Kyu, 20:7772
Jo, Young Gyun, *See* Park, Chang Kyu, 20:9170
Job, P.K., Bremsstrahlung scattering calculations for the beam stops and collimators in the APS insertion-device beamlines, 20:8298 (R;US)
Johanson, E.S., *See* Comolli, A.G., 20:7134
Johansson, Klas, Crack closure - an experimental study, 20:8109 (R;SE;In Swedish)
Johansson, M.A., *See* Klier, K., 20:7564
Johnson, G.R., Final report and recommendations of the ESnet Authentication Pilot Project, 20:9184 (R;US)
Johnson, J.D., *See* Helton, J.C., 20:7820, 20:7821, 20:8509
Johnson, J.R., Implications of scientific and technological developments for radiation protection in the next decade, 20:8631 (R;US)
Johnson, L.R., Recording experiment on Rainier Mesa in conjunction with a reflection survey, 20:8422 (R;US)
See Majer, E.L., 20:8428
Johnson, M.L., Survey speeds to detect one times and three times total contamination values from U.S. Department of Energy Radiological Control Manual, Table 2-2, 20:8398 (R;US)
Johnson, R.E., *See* Reich, F.R., 20:7370
Johnson, S.A., *See* Krumpelt, M., 20:7924, 20:7927
Johnson, T.R., *See* Ackerman, J.P., 20:7278
Johnson, V.G., Ground water impact assessment report for the 216-B-3 Pond system, 20:7455 (R;US)
Jokinen, V., *See* Mavliev, R., 20:8446
Jokiniemi, J., *See* Hautanen, J., 20:8441
Jokiniemi, J.K, *See* Valmari, S.T., 20:7637
Jokiniemi, J.K., Numerical simulation of vapour-aerosol dynamics in high temperature processes, 20:7180 (RA;FI)
See Joutsensaari, J., 20:7182
See Lind, T., 20:7140, 20:7181
See Mikkanen, P., 20:7559
See Ylaetalo, S.I., 20:7150
Jokiniemi, K.J., *See* Lehtinen, K.E.J., 20:8440
Jonatzke, O., *See* Goeller, B., 20:7801
Jones, D.S., *See* Suter, G.W. II, 20:7473
Jones, E.O., Rejuvenation and recovery of electroplating acids using the WADR technology, 20:8038 (R;US)
See Schmidt, A.J., 20:7351
Jones, J.E. Jr., *See* Roberto, J.B., 20:7876
Jones, J.L. Jr., *See* Calley, M.B., 20:7312
Jones, P., *See* Elliott, S., 20:8458
Jones, P.E.R., CANDU operator decision support systems: Lessons learned and future directions, 20:7715 (RA;XA)
Jones, T.E., *See* Pool, K.N., 20:7398
See Tingey, J.M., 20:7345
Jones, T.G., *See* Hwang, Y.S., 20:9089
Joo, Jea Oh, *See* Kang, Young Ho, 20:8100
Joo, Keun Sik, *See* Kang, Young Ho, 20:8100
Jorgensen, J.D., *See* Shaked, H., 20:8083
Josefsson, T.W., Inelastic plasmon and inter-band electron-scattering potentials for Si from dielectric matrix calculations, 20:9016 (R;AU)
K-shell ionization under zone axis electron diffraction conditions, 20:9018 (R;AU)
See Rossouw, C.J., 20:9013
See Smith, A.E., 20:9017
Joseph, A., Comment on the evolution of the isotopic composition of rainfall from a squall line (Niamey, Niger), 20:8536 (RA;XA;In French)
Isotopic characteristics of meteoric water and groundwater in the Sahelo-Sudanese zone, 20:8532 (RA;XA;In French)
Volcanic CO_2 contribution in the geochemical and isotopic equilibrium of the TIDC in the Irhazer aquifers (Niger), 20:8488 (RA;XA;In French)
Joshi, A., *See* Hollenberg, G.W., 20:7347
Joshi, G., *See* Brumby, S.P., 20:8746
Joshi, G.C., *See* Brumby, S.P., 20:8707
See Griffin, C.J., 20:8683
See Harris, B.A., 20:8743, 20:8841
See Ignatiev, A.Yu., 20:8822
Jothimurugesan, K., Simultaneous removal of H_2S and NH_3 in coal gasification processes. Quarterly report, July 1, 1994–September 30, 1994, 20:7109 (R;US)
Joutsensaari, J., Field studies on ash transformation during pulverized coal combustion of bituminous coal, 20:7182 (RA;FI)
See Valmari, S.T., 20:7637
See Ylaetalo, S.I., 20:7150

Jozewicz, W., Emissions reductions in coal-fired home heating stoves through use of briquettes. Quarterly report, April 1, 1994–June 30, 1994, 20:7100 (R;US)
Ju, Hyeong Kook, *See* Sohn, Dong Seong, 20:7704
Ju, M.C., *See* Yang, Y.S., 20:7969
Juergensen, H., Flammable refrigerants in household refrigerators, 20:8004 (RA;US)
Jun, Hyung Gil, *See* Cha, Jong Hee, 20:7690
Jun, I.S., *See* Jeon, H.S., 20:7966
Jung, C.Y., *See* Oh, C.S., 20:7976
Jung, Choong Hwan, *See* Kang, Thae Kap, 20:8125
Jung, Chul Hwan, *See* Ham, Chang Shik, 20:8336
Jung, Euo Chang, *See* Lee, Jong Min, 20:8231
Jung, Heung Joon, *See* Kim, Chang Kyu, 20:7772
Jung, Ki Sok, *See* Choi, Byung Ho, 20:9011
Jung, Kyeong Chai, *See* Chun, Kwan Sik, 20:7755
Jung, M.W., *See* Kim, B.H., 20:7965
Jung, Seung Ho, *See* Kim, Seung Ho, 20:8230
See Kim, Tae Ryong, 20:7692, 20:8234
See Sim, Yoon Sub, 20:7663
Jung, Yong Won, *See* Sung, Ki Woung, 20:8171
Jurvillier, I., Reliability studies by fast electronic simulation. Realization of an apparatus of configuration made by computer in function of the model to study, 20:7707 (R;FR;In French)
Just, W., *See* Erbacher, F.J., 20:7809
Jwon, *See* Seok, Ho Cheon, 20:7673
Jwon, Jong Seon, *See* Seok, Ho Cheon, 20:7673

K

Kabadi, V.N., Improvement of hydrogen solubility and entrainment in hydrocracker feedstocks. Quarterly technical report, July 1, 1994–September 30, 1994, 20:7228 (R;US)
Kabantsev, A.A., Determination of electric and magnetic fields in open trap plasmas by means of atomic-molecular beam hydrogen isotopes, 20:9059 (R;RU;In Russian)
Kabyshev, A.V., Electric conductivity of ion implanted boron nitride, 20:8124 (IA;RU;In Russian)
Kachurin, G.A., Boron-nitrogen interaction in silicon durins a silicon nitrogen structure formation under N^+ ion implantation, 20:9000 (IA;RU;In Russian)
Kadmenskij, A.G., Ion volumetric rechanneling in heated crystal under implantation, 20:9004 (IA;RU;In Russian)
Kadyk, J., *See* Aston, D., 20:8401
Kaenzig, A., *See* Schreiber, G.A., 20:8600
Kagramanyan, V.S., Utilization in BN-800 fast reactors of isolated plutonium being accumulated in the Russian Federation, 20:7272 (RA;XA)
Kahane, S., Elastic scattering cross-sections of 11.4 MeV photons from ^{206,207,208}Pb, ^{209}Bi and ^{181}Ta, 20:8910 (RA;IL)
New analysis of elastic photon scattering from ^{209}Bi, 20:8909 (RA;IL)
Kaita, R., *See* Ono, M., 20:9086
Kal'bittser, Z., *See* Tashlykov, I.S., 20:8093
Kalantar-nayestanaki, N., A review of electron scattering at intermediate energies, 20:8913 (IA;IR;In English, Persian)
Kalinnikov, V.G., *See* Sehrehehtehr, Zh., 20:8383
Kalinovskij, Yu.L., *See* Blaschke, D., 20:8835
Kalya, Z., *See* Adorjan, F., 20:7713
Kamali Moghadam, K., Modulation transfer function measurement for the film-converter imaging technique in neutron radiography, 20:8945 (IA;IR;In English, Persian)
Kamath, B., *See* Butcher, T.A., 20:7951
Kamel, N.H., *See* Abdelmalik, W.E.Y., 20:8539
Kamiyama, T., *See* Shaked, H., 20:8083
Kane, A.J., Leadership – It's everybody's business, 20:9150 (R;US)
Kane, D.J., Method and apparatus for measuring the intensity and phase of an ultrashort light pulse, 20:8271 (PA;US)
Kane, M., *See* Ba, B., 20:8994
Kang, Dae Il, *See* Park, Chang Kyu, 20:9170, 20:9171
Kang, Hee Seok, *See* Chung, Heung Seok, 20:7517
See Park, Hyeon Soo, 20:7320
Kang, Hee Suk, *See* Sung, Ki Woung, 20:8171
Kang, Hui Seok, *See* Chung, Heung Seok, 20:7515
Kang, Il Joon, *See* Byeon, Myeong Uh, 20:8605
See Cho, Han Ok, 20:8604
Kang, Ki Won, *See* Cheong, Yong Moo, 20:8262
Kang, Kyeong Cheol, *See* Kim, Jae Rok, 20:8602
See Lee, Ji Bok, 20:7774
Kang, Myeong Soo, *See* Choi, Chang Beom, 20:7671
Kang, Shin Bok, The development of KAERI management information system -First year: The development of manpower information management system-, 20:9167 (R;KR;In Korean)
Kang, Sin Bok, The development of KAERI management information system (II) -The development of Time Sheet Management System-, 20:9144 (R;KR;In Korean)
Kang, Soon Gu, *See* Ham, Chang Shik, 20:8336
Kang, Thae Kap, Development of Hi-Tech ceramics fabrication technologies -Development of advanced nuclear materials-, 20:8125 (R;KR;In Korean)
Kang, Y.H., Development of Direct Contact Heat Exchangers for solar energy utilization (III), 20:7968 (R;KR;In Korean)
See Lim, S.H., 20:7972
Kang, Yeong Hwan, *See* Kim, Chang Kyu, 20:7772
Kang, Young Ho, Development of metallic fuel materials - Development of the advanced nuclear materials-, 20:8100 (R;KR;In Korean)
Kang, Young Hwan, *See* Ryu, Woo Seong, 20:7693
Kangas, L.J., Alpha spectral analysis via artificial neural networks, 20:7453 (R;US)
Kanjilal, S.K., Structural evaluation of thermocouple probes for 241-AZ-101 waste tank, 20:7385 (R;US)
Kapitonov, I.M., *See* Alimov, A.S., 20:8921
Kaplan, S.N., *See* Hong, Wan-Shick, 20:8393
Kapustka, L.A., *See* Fairbrother, A., 20:7866
Karageorgi, E., *See* Daley, T.M., 20:7329
Karageorgi, E.K., *See* Majer, E.L., 20:8428
Karamysheva, G.A., *See* Vorozhtsov, S.B., 20:8280
Karbo, A., *See* Galadima, S.A., 20:8481
See Zakara, Z., 20:8483
Karbowski, J., *See* Byczuk, K., 20:9029
Karema, H., Particle-turbulence interaction in dilute suspensions, 20:8259 (R;FI)
Kargar, A., *See* Babaei, A.A., 20:9037
Karimipour, V., Quantum chains with G L q(2) symmetry, 20:8727 (IA;IR;In English, Persian)
Karlen, G., Interview-survey of farmers. Experiences after the Chernobyl accident, 20:7884 (R;SE;In Swedish)
Karlstroem, F., *See* Eriksson, Aake, 20:8634
Karpushov, A.N., *See* Davydenko, V.I., 20:9042
Kasperovich, A.V., *See* Tashlykov, I.S., 20:8166
Kasukabe, Y., Characterization of { 11-bar 01 } twin dislocation structures in evaporated titanium thin films by HREM, 20:8151 (R;AU)
Kat'rov, P.D., *See* Kostov, G.K., 20:7520
Katada, M., *See* Sano, H., 20:8157
Katerbau, K.H., *See* Sturm, D., 20:7787
Katipamula, S., Simulation of diurnal thermal energy storage systems: Preliminary results, 20:7600 (R;US)
Katsogiannis, A., Coulomb correction calculations of pp Bremsstrahlung, 20:8821 (R;AU)
Kaufman, A., Phosphoric acid fuel cell for buses, 20:8061 (RA;US)
Kaupanger, R.M., Buried Waste Integrated Demonstration commercialization actions plans. Volume 1, 20:9189 (R;US)
Kauppinen, E., *See* Haemeri, K., 20:8437
See Hautanen, J., 20:8441
See Lehtinen, K.E.J., 20:8440
Kauppinen, E.I, *See* Jokiniemi, J.K., 20:7180
Kauppinen, E.I., *See* Joutsensaari, J., 20:7182
See Lind, T., 20:7140, 20:7181
See Mikkanen, P., 20:7559
See Sinquefield, S.A., 20:7545
See Valmari, S.T., 20:7637
See Ylaetalo, S.I., 20:7150
Kaushal, T.S., Advanced Diesel Engine Component Development Program, final report - tasks 4-14, 20:8056 (R;US)
Kavicky, J.A., *See* VanKuiken, J.C., 20:7904

Kawabe, T., Mirror based fusion neutron sources for fusion material testing, 20:9121 (IA;DE)
Kawahara, H., *See* Aston, D., 20:8401
Kawola, J.S., *See* Martino, A., 20:8194
Kaye, S., *See* Ono, M., 20:9086
See Talvard, M., 20:9083
Kazak, L.A., *See* Prilepo, V.L., 20:8090
See Urmanov, A.R., 20:8999
Kazarian, G.T. Ter, Introduction to the theory of Goyaks. Operator manifold approach to geometry and particle physics, 20:8720 (R;XA)
Kearfott, K.J., *See* Samei, E., 20:8374
KeBling, W., *See* Laevemann, E., 20:8001
Kee, R.J., Understanding and improving materials processing through interpreting and manipulating predictive models, 20:8108 (R;US)
Keefe, M.L., Umatilla hatchery monitoring and evaluation. Annual report 1993, September 1, 1992–October 30, 1993, 20:7576 (R;US)
Kegel, G.H.R., Neutron scattering studies in the actinide region. Progress report, August 1, 1991–July 31, 1994, 20:8906 (R;US)
Keicher, D.M., Laser beam characterization results for a high power CW Nd:YAG laser, 20:8276 (R;US)
Keilmann, F., *See* Urban, M., 20:9075
Kekelidze, L.I., *See* Guldamashvili, A.I., 20:8095
Kelkar, M.G., Integrated approach towards the application of horizontal wells to improve waterflooding performance. Quarterly technical progress report, July 1–September 30, 1994, 20:7213 (R;US)
Keller, H., *See* Blatter, J., 20:9032
Keller, P.E., *See* Kangas, L.J., 20:7453
Kelley, M.H., *See* Celotta, R.J., 20:8959, 20:8960
Kellman, B., *See* Tanzman, E.A., 20:8067
Kelly, D.L., Test and evaluation report, U.S. Department of Transportation Specification 7A Type A radioactive material packaging, WHC Solid Sample Package (unshielded) (3M SafeSend® Reusable Super Pack Shipping System [SP-R1L Kit]), 20:8248 (R;US)
Test plan for a U.S. Department of Transportation Specification 7A Type A radioactive material packaging, WHC Liquid Sample Package (unshielded) (3M SafeSend® Reusable Super Pack Shipping System [SP-R1L Kit]), 20:8247 (R;US)
Kelly, D.M., A simple, closed-form expression for the x-ray reflectivity from superlattices with cumulative roughness, 20:8991 (R;US)
Kelly, M.J., *See* Chason, E., 20:8145
Kemp, P.F., Can we estimate bacterial growth rates from ribosomal RNA content?, 20:8595 (R;US)
Kempe, H., *See* Schaefer, L., 20:8102
Kent, S.M., A survey of surveys, 20:8689 (R;US)
Kerminen, V.M., *See* Pakkanen, T., 20:8445
Kero, R., Raising the IQ in full-text searching via intelligent querying, 20:9188 (R;US)
Kerr, D., *See* Kelkar, M.G., 20:7213
Keruchenko, S.S., *See* Skiba, O.V., 20:7676
Kesselring, P., Energy conversion research at the PSI: combustion, fuels from biomass, solar energy, 20:7914 (IA;CH)
See Winter, C.J., 20:7839
Kessler, G., Safety requirements on future LWR plants, 20:7789 (RA;DE;In German)
Ketchemen, B., Environmental isotopic study of the "Grand Yaere" aquifers (North-Cameroon), 20:8484 (RA;XA;In French)
Keter, A., Application of artificial neural networks in estimation of probable accident causes in nuclear power plants, 20:7745 (RA;XA)
Keum, Jong Yong, *See* Lee, Ji Ho, 20:9192
Khachaturyan, M.N., *See* Abraamyan, Kh.U., 20:8936
Khalil, S.S., Supersymmetric magnetic moments sum rules and spontaneous supersymmetry breaking, 20:8830 (R;XA)
Khalturin, V.I., A study of small explosions and earthquakes during 1961–1989 near the Semipalatinsk Test Site, Kazakhstan, 20:8429 (R;US)
Khan, A.R., *See* Ashraf, M.M., 20:7534
Khan, H.H., On the degree of approximation by Jackson type operators, 20:8678 (R;XA)
Khan, L.A., Radiological consequence analysis for upgradation of Pakistan Research Reactor-1 from 9 to 10 MW, 20:7758 (R;PK)
Thermal hydraulic analysis for upgradation of Pakistan Research Reactor-1 from 9 to 10 MW, 20:7777 (R;PK)
Khan, T.A., ALARA notes, Number 8, 20:7291 (R;US)
Khatib-Rahbar, M., *See* Boyack, B.E., 20:7817
Khazanovich, I.M., *See* Anosov, A.I., 20:7725
Kho, C.C., *See* Kwon, C.H., 20:7572
Khoda-Bakhash, R., Increase gain of volume ignition, 20:9102 (IA;IR;In English, Persian)
Khodasevich, V.V., *See* Uglov, V.V., 20:8096
Kholmatov, A.Kh., *See* Usmanov, P.N., 20:8865
Khriplovich, I.B., Nuclear-spin-dependent parity-nonconserving effects in thallium, lead and bismuth atoms, 20:8953 (R;RU)
See Dmitriev, V.F., 20:8848, 20:8849
Khristov, Kh.G., *See* Belov, A.G., 20:8289
See Gangrskij, Yu.P., 20:8922
See Kondev, F.G., 20:8917
Khudaverdyan, A.G., *See* Abraamyan, Kh.U., 20:8936
Khudik, V.N., Longitudinal losses of charged particles from an open configuration with arbitrary β ratio, 20:9058 (R;RU;In Russian)
Khvastunov, M.S., Einstein's Length Concept, 20:8658 (R;XJ;In Russian)
Simultaneity and Length of the Moving Rod, 20:8659 (R;XJ;In Russian)
Ki, *See* Cho, Man, 20:7677
Kiefer, W., *See* Ivanda, M., 20:8992
Kielpinski, A.L., *See* Whitehouse, J.C., 20:7432
Kieu, T.D., Chiral gauge theory in four dimensions, 20:8752 (R;AU)
Electroweak interactions on the lattice, 20:8750 (R;AU)
Simulation with complex measures, 20:8774 (R;AU)
What's wrong with anomalous chiral gauge theory?, 20:8748 (R;AU)
Kil, Chung Sup, *See* Chang, Jong Hwa, 20:9193
Kilpelaeinen, M., *See* Hautanen, J., 20:8441
Kim, *See* Lee, Jong Min, 20:8231
Kim Su Men, *See* Tarantin, N.I., 20:8919
Kim, B.H., Study on the hydrogen production and cathodic protection using photovoltaic systems, 20:7965 (R;KR;In Korean)
Kim, B.S., *See* Ko, C.J., 20:8013
See Kwon, C.H., 20:7572, 20:8012
See Shin, H.S., 20:7977
Kim, Bok Deuk, *See* Chung, Jang Hwan, 20:7670
See Chung, Moon Ki, 20:7686
Kim, Bong Gi, *See* Rhee, Bo Wook, 20:7683
Kim, Bong Goo, *See* Yang, Myeong Seung, 20:7668
Kim, Bong Hwan, *See* Chang, Si Young, 20:8623
Kim, Bong Ki, *See* Seok, Ho Cheon, 20:7669, 20:7673
Kim, Bong Koo, *See* Kim, Chang Kyu, 20:7772
Kim, Byeong Ho, *See* Hwang, Sung Tai, 20:7678
Kim, Byeong Uh, *See* Lee, Young Bok, 20:7754
Kim, Byoung Chul, *See* Lee, Sam Lai, 20:7660
Kim, Byung Soo, *See* Kim, Seung Ho, 20:8230, 20:8236
See Lee, Jong Min, 20:8235
Kim, Byung Woo, Overall analysis of meteorological information in the Daeduk nuclear complex, 20:9142 (R;KR;In Korean)
Kim, C.H., *See* Choi, I.S., 20:7971
See Lee, H.K., 20:7970
See Son, J.I., 20:8457
Kim, Chan Joong, *See* Hong, Gyee Won, 20:9038
Kim, Chang Hoi, *See* Kim, Seung Ho, 20:8230, 20:8236
See Lee, Jong Min, 20:8235
Kim, Chang Hwoi, *See* Ham, Chang Shik, 20:8336
Kim, Chang Kyu, Development of the nuclear fuel materials for research reactor -Development of the advanced nuclear materials-, 20:7772 (R;KR;In Korean)
See Kang, Young Ho, 20:8100
Kim, Cheol Jung, *See* Kim, Jeong Moog, 20:8233
Kim, Chul Jung, The development of laser technology, 20:8702 (R;KR;In Korean)
Kim, D.C, Development of CCS application technology in industries (II), 20:7188 (R;KR;In Korean)
Kim, D.H., Development of processing technique for the electrochromic window, 20:7973 (R;KR;In Korean)
See Jeon, H.S., 20:7966
Kim, D.S., *See* Oh, C.S., 20:7976
See Shin, H.S., 20:7977

Kim, Deok In, *See* Kim, Yong, 20:9139
Kim, Dong Ha, Development of computing code system for level 3 PSA -A study for nuclear safety improvement-, 20:7756 (R;KR;In Korean)
See Yoo, Keon Joong, 20:7657
Kim, Dong Hoon, *See* Kim, Yong Seong, 20:7773
Kim, Dong Hui, *See* Chung, Moon Kyu, 20:7655
Kim, Dong Soo, *See* Chang, Won Pyo, 20:7664
See Kim, Jae Rok, 20:7519
See Kim, Yong, 20:9139
See Yoo, Keon Joong, 20:7656
Kim, Doo Il, *See* Chang, Won Pyo, 20:9169
Kim, Duck Hueon, *See* Shin, Jang Soo, 20:8388
Kim, Duck Hyun, *See* Cha, Hyung Ki, 20:8988
Kim, E.I., *See* Jeon, H.S., 20:7966
Kim, Eun Han, *See* Han, Moon Hee, 20:8620
See Kim, Byung Woo, 20:9142
See Lee, Young Bok, 20:7754
See Shu, Kyung Suk, 20:7757
Kim, Eung Ho, *See* Yoo, Jae Hyeong, 20:8188
Kim, H.S., *See* Yang, J.H., 20:7830
Kim, H.W., *See* Kim, B.H., 20:7965
Kim, Han Soo, *See* Yang, Myeong Seung, 20:7668
Kim, Hee Cheol, *See* Chang, Won Pyo, 20:9169
Kim, Hee Dong, The development of a severe accident analysis code -Research on the improvement of nuclear safety-, 20:9172 (R;KR;In Korean)
Kim, Hee Kyung, *See* Chang, Jong Hwa, 20:7662
Kim, Ho Dong, *See* Park, Hyeon Soo, 20:7510
See Park, Hyun Soo, 20:7672
Kim, Hong Pyo, *See* Kim, Uh Chul, 20:7694, 20:8264
Kim, Huhn Jun, Study of materials properties by neutron beam applications -Development of the advanced nuclear materials-, 20:8391 (R;KR;In Korean)
Kim, Hui Dong, *See* Yoo, Keon Joong, 20:7656
Kim, Hwa Sup, *See* Yang, Maeng Ho, 20:9140
Kim, Hwa Sup: Yang, Maen, Analysis of the trend in international nuclear affairs -With reference to nuclear policy development in the UK-, 20:7883 (R;KR;In Korean)
Kim, Hyeon Jeong, *See* Kang, Sin Bok, 20:9144
Kim, Hyeong Soo, *See* Choi, Chang Beom, 20:7671
Kim, Hyun Joon, *See* Yang, Maeng Ho, 20:9140
Kim, Hyun Jun, *See* Kim, Hwa Sup: Yang, Maeng Ho, 20:7883
Kim, Hyung Guk, *See* Chang, Jong Hwa, 20:9193
Kim, Ik Hyeon, *See* Lee, Han Young, 20:9199
Kim, Il Kon, *See* Rhee, Bo Wook, 20:7683
Kim, In Kyu, *See* Lee, Kang Suk, 20:8590
Kim, In Sik, *See* Yoo, Kun Joong, 20:7665
Kim, J., A numerical prediction of the precipitation and hydrology of California, 20:8653 (R;US)
Kim, J.B., *See* Kang, Y.H., 20:7968
Kim, J.D., *See* Kim, D.C, 20:7188
See Yang, J.H., 20:7830
Kim, J.G., *See* Choi, I.S., 20:7971
See Lee, H.K., 20:7970
Kim, J.K., *See* Park, Y.J., 20:8047
Kim, J.P., *See* Ko, C.J., 20:8013
See Kwon, C.H., 20:7572, 20:8012
See Shin, H.S., 20:7977
Kim, J.W., *See* Sim, K.S., 20:7535, 20:7569
See Son, Y.M., 20:8456
Kim, Jae Hee, Intelligent control and automation technology for nuclear applications, 20:7695 (R;KR;In Korean)
See Kwon, Kee Choon, 20:8337
Kim, Jae Ho, *See* Jin, Joon Ha, 20:7523
Kim, Jae Hui, Intelligent control and automation technology for nuclear applications, 20:7748 (R;KR;In Korean)
Kim, Jae Hwan, *See* Park, Chang Kyu, 20:9170
Kim, Jae Rok, Studies on application of radiation and radioisotopes, 20:8602 (R;KR;In Korean)
Studies on the production and application of radioisotopes - Studies on application of radiation and radioisotopes-, 20:7519 (R;KR;In Korean)
Kim, Jae Seong, *See* Kim, Jae Rok, 20:8602
See Yoo, Jang Ryoel, 20:8603
Kim, Jae Sung, *See* Lee, Young Il, 20:8624
Kim, Jang Ryeol, *See* Chang, Si Young, 20:8623
Kim, Jeong Do, *See* Chang, Jong Hwa, 20:9193
See Cho, Man, 20:7677
Kim, Jeong Moo, *See* Lee, Chang Woo, 20:8619
See Lee, Jeong Ho, 20:8618, 20:8622
Kim, Jeong Moog, Development of 200 W class Nd:YAG laser with unstable resonator, 20:8233 (R;KR;In Korean)
Kim, Ji Whan, *See* Kim, Hwa Sup: Yang, Maeng Ho, 20:7883
See Yang, Maeng Ho, 20:9140
Kim, Jin Kyu, *See* Chun, Kwan Sik, 20:7755
See Kim, Sang Bok, 20:8625
See Lee, Kang Suk, 20:8590
Kim, Jin Kyung, *See* Kim, Jae Rok, 20:7519
Kim, Jong Bum, *See* Yoo, Bong, 20:7696
Kim, Jong Gook, *See* Choi, Byung Ho, 20:9011
Kim, Jong Ho, *See* Chun, Kwan Sik, 20:7518
See Park, Hyeon Soo, 20:7320
Kim, Jong In, *See* Yoo, Bong, 20:7696
Kim, Jong Jin, *See* Hong, Gyee Won, 20:9038
Kim, Jong Myeong, *See* Kang, Shin Bok, 20:9167
Kim, Jong Soo, *See* Chang, Si Young, 20:8623
Kim, Jong Sook, *See* Cho, Man, 20:7677
See Kim, Hwa Sup: Yang, Maeng Ho, 20:7883
See Yang, Maeng Ho, 20:9140
Kim, Joon Yeon, *See* Kim, Yong Seong, 20:7773
See Lee, Ji Bok, 20:7774
Kim, Jung, *See* Kim, Chul Jung, 20:8702
Kim, Jung Bog, *See* Kim, Chul Jung, 20:8702
See Lee, Jong Min, 20:8231
Kim, Jung Bok, *See* Chung, Chong Eun, 20:8390
See Lee, Jong Min, 20:7516
See Park, Kwang Hyun, 20:8617
Kim, Jung Do, Nuclear data evaluation and group constant generation for reactor analysis, 20:9168 (R;KR;In Korean)
See Kang, Young Ho, 20:8100
See Min, Byung Joo, 20:9191
Kim, Jung Soo, *See* Ham, Chang Shik, 20:8336
Kim, Jung Taek, *See* Kwon, Kee Choon, 20:8337
Kim, K.H., *See* Park, K.H., 20:7979
Kim, K.I., *See* Cho, S.C., 20:8026
Kim, Kang Suk, *See* Chang, Jong Hwa, 20:9193
Kim, Keung Koo, *See* Sohn, Dong Seong, 20:7704
Kim, Ki Baek, *See* Hong, Gyee Won, 20:9038
Kim, Ki Hwan, *See* Kang, Young Ho, 20:8100
See Kim, Chang Kyu, 20:7772
Kim, Ki Yeop, *See* Jin, Joon Ha, 20:7522, 20:7523
Kim, Kil Yoo, *See* Kim, Dong Ha, 20:7756
See Yoo, Keon Joong, 20:7657
Kim, Ko Ryeo, *See* Kim, Jae Hee, 20:7695
See Kim, Jae Hui, 20:7748
Kim, Kook Chan, *See* Lee, Kang Suk, 20:8590
Kim, Kwang Rag, *See* Sung, Ki Woung, 20:8171
Kim, Kwang Rak, *See* Chung, Heung Seok, 20:7515, 20:7517
See Hwang, Sung Tai, 20:7678
Kim, Kwang Suk, *See* Kim, Jeong Moog, 20:8233
Kim, Kwang Uk, *See* Yoo, Jae Hyeong, 20:8188
Kim, Kyeong Doo, *See* Chang, Won Pyo, 20:9169
Kim, Kyong Doo, *See* Chang, Won Pyo, 20:7664
Kim, Kyong Ho, *See* Kang, Thae Kap, 20:8125
Kim, M., *See* Nelson, C.A., 20:8717
Kim, N.J., *See* Kang, Y.H., 20:7968
Kim, S.H., *See* Son, J.I., 20:8457
See Son, Y.M., 20:8456
Kim, S.U., *See* Lee, H.K., 20:7970
Kim, Sam Rang, *See* Lee, Chang Woo, 20:8619
See Lee, Jeong Ho, 20:8618, 20:8622
See Lee, Myeon Joo, 20:8211
Kim, Sang Baek, *See* Yoo, Kun Joong, 20:7665
Kim, Sang Bok, The effects of acute radiation exposure on the serum components, 20:8625 (R;KR;In Korean)
See Lee, Kang Suk, 20:8590
Kim, Sang Sik, *See* Choi, Chang Beom, 20:7671

Kim, Sang Won, *See* Choi, Chang Beom, 20:7671
Kim, Se Chang, Development of Megawatt Demand Setter for Plant Operating Flexibility, 20:7658 (R;KR;In Korean)
Kim, Seok Hoon, *See* Kim, Yong Seong, 20:7773
Kim, Seok Nam, *See* Seok, Ho Cheon, 20:7673
Kim, Seon Kook, *See* Lee, Jong Min, 20:8232, 20:8293
Kim, Seong Ho, *See* Lee, Jong Min, 20:8169, 20:8293
Kim, Seong Ki, *See* Song, Ki Dong, 20:7860
Kim, Seong Kyu, *See* Hwang, Churl Kew, 20:9068
Kim, Seong Oh, *See* Sim, Yoon Sub, 20:7663
Kim, Seong Soo, *See* Lee, Jae Kyung, 20:7659
Kim, Seung Bok, *See* Chung, Chong Eun, 20:8390
See Park, Kwang Hyun, 20:8617
Kim, Seung Ho, The development of advanced robotics for the nuclear industry, 20:8230 (R;KR;In Korean)
The development of robotic system for the nuclear power plants - The development of advanced robotics for the nuclear industry-, 20:8236 (R;KR;In Korean)
See Lee, Jong Min, 20:8235
Kim, Seung Jun, *See* Kim, Jae Rok, 20:7519
Kim, Seung Soo, *See* Song, Ki Dong, 20:7860
Kim, Shi Dal, *See* Yoo, Keon Joong, 20:7657
Kim, Shi Hwan, *See* Cho, Man, 20:7677
See Sohn, Dong Seong, 20:7704
Kim, Shi Hyeong, *See* Yang, Myeong Seung, 20:7668
Kim, Si Hwan, *See* Park, Chang Kyu, 20:9170
Kim, Soo Kyung, Theoretical and experimental investigation of a high-temperature latent heat storage system with a salt ceramic composite as storage medium, 20:7604 (R;DE;In German)
Kim, Su Sung, *See* Kim, Chul Jung, 20:8702
Kim, Sun Ja, *See* Lee, Ji Ho, 20:9192
Kim, Sun Jae, *See* Kang, Thae Kap, 20:8125
Kim, Sun Kuk, *See* Lee, Jong Min, 20:8169
Kim, Sung Ho, *See* Kim, Chul Jung, 20:8702
See Lee, Jong Min, 20:7516, 20:8231
Kim, Sung Ki, *See* Choi, Young Myung, 20:9146
Kim, Sung Kyu, *See* In, Sang Ryul, 20:9107
See Lee, Kwang Won, 20:9106
Kim, Sung Oog, *See* Kim, Chul Jung, 20:8702
Kim, Sung Soo, *See* Ryu, Woo Seong, 20:7693
Kim, Tae Joon, *See* Hwang, Sung Tai, 20:7678
Kim, Tae Ryong, A study on the change in dynamic characteristics of reactor internals, 20:7692 (R;KR;In Korean)
The development of optimal design technology in robotics -The development of advanced robotics for the nuclear industry-, 20:8234 (R;KR;In Korean)
See Kim, Seung Ho, 20:8230
Kim, Tae Un, *See* Yoo, Keon Joong, 20:7657
Kim, Tae Whan, *See* Lee, Ji Ho, 20:9192
Kim, Tae Woon, *See* Park, Chang Kyu, 20:9171
Kim, Uh Chul, A preliminary study for the life extension of nuclear power plants, 20:7694 (R;KR;In Korean)
Material performance evaluation -Development of the advanced nuclear materials-, 20:8264 (R;KR;In Korean)
Kim, Uh Kon, *See* Hong, Gyee Won, 20:9038
Kim, W., *See* Markel, V.A., 20:8980
Kim, W.B., *See* Noh, D.S., 20:7258
Kim, Wan, *See* Choi, Byung Ho, 20:9011
See Lee, Jong Min, 20:8293
Kim, Won Ho, *See* Yoo, Jae Hyeong, 20:8188
Kim, Won Seok, *See* Chang, Won Pyo, 20:7664
Kim, Woong Ki, *See* Kim, Seung Ho, 20:8230, 20:8236
See Lee, Jong Min, 20:8235
Kim, Y.I., *See* Choi, I.S., 20:7971
See Lee, H.K., 20:7970
Kim, Y.N., *See* Yang, J.H., 20:7830
Kim, Y.S., *See* Sim, K.S., 20:7535, 20:7569
See Son, J.I., 20:8457
Kim, Yeon Koo, *See* Park, Jin Ho, 20:8621
Kim, Yeon Sik, *See* Sim, Yoon Sub, 20:7663
Kim, Yeon Soo, *See* Hong, Gyee Won, 20:9038
Kim, Yeong Cheol, *See* Cho, Man, 20:7677
Kim, Yeong Hwan, *See* Yoo, Jae Hyeong, 20:8188
Kim, Yeong Il, *See* Sohn, Dong Seong, 20:7704
Kim, Yeong In, *See* , 20:7677
See Cho, Man, 20:7677
Kim, Yeong Jin, *See* Sohn, Dong Seong, 20:7704
Kim, Yeong Kyoon, *See* Cho, Man, 20:7677
Kim, Yeong Taek, *See* Kang, Sin Bok, 20:9144
Kim, Yong, A study for developing training courses of the nuclear training center -with priority given to the training goals of KAERI-, 20:9139 (R;KR;In Korean)
Kim, Yong Chae, *See* Kim, Huhn Jun, 20:8391
Kim, Yong Eak, *See* Sung, Ki Woung, 20:8171
Kim, Yong Ik, *See* Chung, Heung Seok, 20:7515, 20:7517
Kim, Yong Seong, Design, fabrication and installation of irradiation facilities -Advanced nuclear material development-, 20:7773 (R;KR;In Korean)
Kim, Yong Wan, *See* Yoo, Bong, 20:7696
Kim, Yoo Seok, *See* Chae, Jong Seo, 20:8325
Kim, Yoon Hoi, *See* Choi, Chang Beom, 20:7671
Kim, You Sun, *See* Sung, Ki Woung, 20:8171
Kim, Young Jin, *See* Chang, Jong Hwa, 20:9193
Kim, Young Joong, *See* Kim, Yong, 20:9139
Kim, Young Min, *See* Lee, Ji Ho, 20:9192
Kim, Young Sik, *See* Chang, Jong Hwa, 20:9193
Kimari, R., Heat cost allocation in Finland, 20:7980 (R;FI;In Finnish)
Kimmel, G., Enhancing XRPD pattern quality with line profile fitting in multiphase systems, 20:8155 (RA;IL)
See Dayan, D., 20:8087
King, M.E., A measurement of the left-right, forward-backward asymmetry for charm quarks using D^{*+} and D^{+} mesons, 20:8816 (R;US)
Test of an array of CsI(Tl) crystal towers for a low or medium energy $e^{+}e^{-}$ collider calorimeter, 20:8400 (R;US)
King, R.R., Back surface cell structures for reducing recombination in CZ silicon solar cells, 20:7594 (R;US)
See Cuevas, A., 20:7590
King-Jones, K.H., *See* Campbell, J.H., 20:7533
Kinishita, K., *See* Shaked, H., 20:8083
Kirchstetter, B., *See* Butcher, T.A., 20:7951
Kirillovich, A.P., *See* Skiba, O.V., 20:7676
Kirilova, D.P., *See* Chizhov, M.V., 20:8730
Kirkegaard, C., Diffusion of volatile organic components through concrete floors, 20:8504 (RA;DK;In Danish)
Kirkpatrick, A., *See* Romero, A.E. Jr., 20:7605
Kirschnick, H.H., Improvements in heavy oil fuel systems for marine diesel engines, 20:8057 (R;DE;In German)
Kiselev, M.A., *See* Maayouf, R.M.A., 20:8947
Kisly, V.A., *See* Skiba, O.V., 20:7676
Kispert, L.D., Molecular accessibility in oxidized and dried coals. Quarterly report, 20:7147 (R;US)
Kitsuno, Yu, *See* Hong, Wan-Shick, 20:8393
Kladnitskaya, E.N., *See* Bekmirzaev, R.N., 20:8933
Klein, A.C., *See* Dodd, B., 20:7765
Klem, J.F., *See* Zolper, J.C., 20:7593
Klemm, R.A., *See* Ledvij, M., 20:9027
Klevgard, L.A., Comparison of current state residential energy codes with the 1992 model energy code for one- and two-family dwellings; 1994, 20:8007 (R;US)
Klibanov, A.M., *See* Scott, C.D., 20:7570
Klier, K., High octane ethers from synthesis gas-derived alcohols. Quarterly technical progress report, January–March, 1993, 20:7564 (R;US)
Klimenko, S.V., New informative techniques in high energy physics, 20:9164 (R;RU;In Russian)
Klissurska, R., *See* Brooks, K.G., 20:8135
Kluge, H.Yu., *See* Yushkevich, Yu.V., 20:8324
Knapp, F.F. Jr., Nuclear Medicine Program progress report for quarter ending September 30, 1994, 20:8218 (R;US)
Knapp, G.S., Cryogenic monochromator as a solution to undulator heat loads at third generation synchrotron sources, 20:8309 (R;US)
Knapp, R.M., *See* Zhang, X., 20:7199
Knapp, S.M., Evaluation of juvenile fish bypass and adult fish passage facilities at water diversions in the Umatilla River. Annual and interim progress report, October 1990–September 1991, 20:7573 (R;US)

Knoglinger, E., *See* Saphier, D., 20:7667
Knutson, B.J., Global modeling of Hanford tank waste pretreatment alternatives within a total cleanup system using ASPEN PLUS™, 20:7371 (R;US)
Knutson, D.E., The Environmental and Molecular Sciences Laboratory project – Continuous evolution in leadership, 20:7487 (R;US)
Ko, C.J., Study on classification of fuel consumption for waggon and jeep and comparison of CVS-75 mode and on-road fuel economy, 20:8013 (R;KR;In Korean)
See Kwon, C.H., 20:8012
See Shin, H.S., 20:7977
Ko, D, *See* Lee, Jong Min, 20:8169
Ko, Do Kyeong, *See* Lee, Jong Min, 20:8231
Ko, Do Kyung, *See* Kim, Chul Jung, 20:8702
Ko, Dok Yung, *See* Lee, Jong Min, 20:7516
Ko, Han Seok, *See* Oh, Keun Bae, 20:9141
Ko, Han Seong, *See* Choi, Young Myung, 20:9143
Ko, Han Suk, *See* Choi, Young Myung, 20:9146
Ko, Yeong Cheol, *See* Kang, Sin Bok, 20:9144
Ko, Yeong Mo, *See* Kim, Chang Kyu, 20:7772
Kobashi, S., *See* Satoh, T., 20:7732
Kobayashi, H., *See* Tuson, G.B., 20:8023
Kobayashi, K., *See* Shibata, S., 20:8160
Kobayashi, R., *See* Azad, H., 20:8718
Koca, R., Final report, exhaust air heat pump monitoring study, 20:8019 (R;US)
Kock, A. de, *See* Thackeray, M.M., 20:7829
Koh, C.B., *See* Park, Y.J., 20:8047
Koh, Kyung Hwan, *See* Ji, Young Hoon, 20:8389
Kol, R., *See* Pelled, O., 20:8361
Kolaczkowski, A., *See* Dingman, S.E., 20:7649
Kolb, G., *See* Hirtz, W., 20:7597
Kolen'ko, A.P., *See* Gaitinov, A.Sh., 20:8924
Kolesnikov, V.I., *See* Afanas'ev, S.V., 20:8376
Kolo, B., *See* Hamann, N., 20:8819
Komarov, A.F., *See* Bojko, E.B., 20:8089
Komarov, F.F., Study of Ta-Si and CoSi systems implanted by boron and antimony ions, 20:9002 (IA;RU;In Russian)
See Bojko, E.B., 20:9001
See Gajduk, P.I., 20:8996
Kon'shin, I.V., *See* Grigor'ev, V.V., 20:9006
Kondev, F.G., On a possibility of application of the MT-25 microtron in the Plovdiv University, 20:8917 (IA;RU;In Russian)
Study on the (γ, γ') reactions with population of high spin ^{180m}Hf, ^{190m}Os and ^{204m}Pb isomers, 20:8920 (IA;RU;In Russian)
See Belov, A.G., 20:8923
See Gangrskij, Yu.P., 20:8922
Kondo, T., New fusion research and development stage with an experimental reactor, 20:9113 (IA;DE)
Plan of new stage fusion R and D in Japan, 20:9109 (IA;DE)
Konings, D.A.M., Determination of architectural elements of RNA structure, 20:8558 (RA;US)
Konno, O., *See* Kuzin, A., 20:8940
Kononenko, V.K., Electron-optical nonlinear interaction in asymmetric quantum-well laser heterostructures, 20:8694 (R;XA)
Konopka, A.K., Computational molecular biology in logical perspective, 20:8559 (RA;US)
Konoplyannikov, A.K., Prototype of fronted electronics for tracking detectors with high channel density, 20:8367 (R;RU;In Russian)
Konosavsky, P.K., *See* Mironenko, V.A., 20:7326
See Rumynin, V.G., 20:8499
Konstantinov, V.F., Beam tests of 'Spacal' type modules for a high pressure gas calorimeter, 20:8370 (R;RU)
Koo, Jee Hyu, *See* Chun, Kwan Sik, 20:7518
See Chung, Heung Seok, 20:7517
Koo, Kyong Hoe, *See* Yoo, Bong, 20:7696
Koo, Yang Heon, *See* Sohn, Dong Seong, 20:7704
Koontz, R.F., *See* Wang, J.W., 20:8328
Kopasz, J.P., *See* Billone, M.C., 20:9090
Koppenaal, D.W., *See* Farmer, O.T. III, 20:7352
Korhonen, P., Effects of nitric acid vapour on the radiative properties of convective clouds, 20:8442 (RA;FI)
See Ahonen, T., 20:8444
Koritarov, V.S., *See* VanKuiken, J.C., 20:7904
Kornfeld, H., *See* Paran, J., 20:8366
Korob, R.O., Determining uranium enrichment by gamma spectrometry., 20:8158 (IA;MX)
Korotkin, Yu.S., *See* Belov, A.G., 20:8291
Korotkiyan, V.M., On the Compton Twist-3 Asymmetries, 20:8762 (R;XJ)
Korsbech, U., Core scanning for Th, U and K. Problems and solutions, 20:8469 (R;DK)
Kortelainen, P., Contribution of organic acids to the acidity of Finnish lakes, 20:8549 (R;FI)
Korzhik, M., *See* Moses, W.W., 20:8392
Kosmowski, K.T., Representation of topological and functional-logical knowledge in an expert system for probabilistic safety analysis, 20:7642 (RA;XA)
Kosov, D.S., *See* Vdovin, A.I., 20:8861
Kosower, D.A., *See* Bern, Z., 20:8769
Kossilov, A., *See* Naser, J., 20:9197
Kostov, G.K., State of and trends in the development of Burgas centre for electron-beam technologies and polymers, 20:7520 (IA;RU;In Russian)
Kostov, G.N., Radiation-induced synthesis and properties of fluorine-containing cation-exchange membranes, 20:8210 (IA;RU;In Russian)
Kotel'nikov, I.A., HF-stabilization of plasma with sharp boundary, 20:9066 (R;RU;In Russian)
Optimization of an expander of a gas-dynamic trap, 20:9065 (R;RU;In Russian)
Kotov, A.V., The model of radiation-induced crystallization and amorphous layer growth in semiconductors under light ion irradiation, 20:8092 (IA;RU;In Russian)
Kouzes, R.T., *See* Kangas, L.J., 20:7453
Kovalevsky, M.Yu., Hamiltonian dynamics of the condensed media with spontaneously broken symmetry, 20:9023 (R;XA)
New Fermi-liquid approach for the theory of disordered magnetics, 20:8699 (R;XA)
Kowalenko, V., Extensions and results from a method for evaluating fractional integrals, 20:8708 (R;AU)
Kozak, J., *See* Chen Falai, 20:8670
Kozhevnikov, S.V., *See* Dokukin, E.B., 20:8987
Kozhin, M.A., *See* Abraamyan, Kh.U., 20:8936
Kozlov, G.A., Instability of Weak Vacuum, 20:8766 (R;XJ)
Krajewski, R.F., Development of oil heat chimney venting tables, 20:7958 (RA;US)
See Strasser, J., 20:7957
Krasemann, H.L., *See* Bernem, K.H. van, 20:8530
Krasklewicz, J., *See* Dubnicka, S., 20:8792
Krasnokutskij, R.N., Cable connection between the detector and low-noise amplifier as an alternative of the radiation-resistant amplifiers, 20:8369 (R;RU;In Russian)
See Konstantinov, V.F., 20:8370
Krasnukha, S.V., Forecast reactivity program for complex loadings, 20:7717 (RA;XA)
Kraushaar, P.F. Jr., *See* Lee, S.A., 20:8754
Krauter, K., *See* Hendrickson, L., 20:8308
Kravitz, S.H., High-performance GaAs/AlGaAs optical modulators: Their performance and packaging for microwave photonic integrated circuits, 20:8277 (R;US)
Krawiec, S., Molecular biological enhancement of coal desulfurization: Cloning and expression of the sulfoxide/sulfone/sulfonate/sulfate genes in pseudomonads and Thiobacillae. First quarterly report, July 1989–September 1989, 20:7112 (R;US)
Molecular biological enhancement of coal desulfurization: Cloning and expression of the sulfoxide/sulfone/sulfonate/sulfate genes in pseudomonads and Thiobacillae. Third quarterly report, January 1990–March 1990, 20:7113 (R;US)
Molecular biological enhancement of coal desulfurization. Final report, 20:7114 (R;US)
Krieg, R., Loads affecting the reactor pressure vessel in the event of a steam explosion, 20:7796 (RA;DE;In German)
See Dolensky, B., 20:7810
See Goeller, B., 20:7801
Kriikku, E.M., FY94 Office of Technology Development Mixed Waste Operations Robotics Demonstration, 20:7504 (R;US)

Krinsky, S., *See* Stefan, P.M., 20:8312
Krishnaraj, P., Oxygen stoichiometry and its influence on superconductivity in $Bi_2Sr_2CaCu_2O_{8+x}$, 20:8114 (R;US)
Kristiansen, F., Improvement of effect of a solar heating system, 20:7603 (R;DK;In Danish)
Krivokhizhin, V.G., *See* Aliev, R.M., 20:8925
Kroeger, W., Nuclear power plant safety in the framework of future energy systems, 20:7782 (IA;CH)
Kroells, W., *See* Schreiber, G.A., 20:8600
Kromann, H., *See* Gudbjerg, E., 20:8029
Kronberg, J.W., Linear optocoupler, 20:8274 (PA;US)
Krouglikov, B.S., Exact smooth classification of Hamiltonian vector fields on symplectic 2-manifolds, 20:8673 (R;XA)
Krumpelt, M., Advances in research for solid oxide fuel cells, 20:7915 (R;US)
Advances in research for solid oxide fuel cells, 20:7921 (RA;US)
Lithium ferrate and lithium cobaltate cathodes for molten carbonate fuel cells, 20:7925 (RA;US)
Molten carbonate fuel cell with high power density, 20:7927 (RA;US)
Multiply manifolded molten carbonate fuel cells, 20:7924 (RA;US)
Pitting corrosion of aluminized seals in molten carbonate fuel cells, 20:7928 (RA;US)
Sealant materials for the solid oxide fuel cell, 20:7930 (RA;US)
Support research for solid oxide fuel cells, 20:7923 (RA;US)
Krupa, D., Multichannel Resonances in Coupled Channels of Meson Scattering: Scalar Sector, 20:8836 (R;XJ;In Russian)
Krupa, L., *See* Ruzicka, J., 20:9010
Krushelnick, K.M., X-ray laser studies using plasmas created by optical field ionization, 20:9084 (R;US)
Kruspe, W., *See* Schreiber, G.A., 20:8601
Ku, Che Hyu, *See* Sung, Ki Woung, 20:8171
Ku, Yang Hyeon, *See* Kim, Chang Kyu, 20:7772
Kucera, G.H., *See* Krumpelt, M., 20:7925
Kucera, M., Addressing the environmental burden remained after uranium surveying, mining and milling, 20:7448 (IA;CZ;In Czech)
Kudriavtsev, E.G., Russian prospects for plutonium accumulation and utilization, 20:7271 (RA;XA)
Kudsk, P., *See* Gudbjerg, E., 20:8029
Kudyshev, A.N., Electron induced conductivity in argon ion implanted GaAs, 20:8097 (IA;RU;In Russian)
Kuehn, P., Overview of results of a detailed survey of contamination of the Ploucnice flood plain, 20:8537 (IA;CZ;In Czech)
See Kucera, M., 20:7448
Kueper, T., *See* Krumpelt, M., 20:7921
Kueper, T.W., *See* Krumpelt, M., 20:7915, 20:7923
Kugel, H., *See* Ono, M., 20:9086
Kuhn, D., *See* Huber, R., 20:7802
Kuhta, L., *See* Bojko, I.R., 20:8386
Kuk, Il Hiun, Inconel alloys development -Development of the advanced nuclear materials-, 20:8101 (R;KR;In Korean)
Kuklin, A.I., *See* Maayouf, R.M.A., 20:8947
Kul'dzhanov, B.K., *See* Anastasov, A., 20:8863
Kulikauskas, V.S., *See* Gordeeva, G.V., 20:8091
See Guldamashvili, A.I., 20:8095
See Tashlykov, I.S., 20:8166
Kulmala, M., *See* Ahonen, T., 20:8444
See Korhonen, P., 20:8442
See Laaksonen, A., 20:8443
See Vesala, T., 20:8438
Kulsrud, R.M., Important plasma problems in astrophysics, 20:8706 (R;US)
Kumar, P., *See* Tiwary, S.N., 20:8952
Kumar, R., *See* Krumpelt, M., 20:7930
Kummer, W., *See* Golshani, A., 20:8834
Kung, H., *See* Walter, K.C., 20:9012
Kunselman, C.W., *See* Adkisson, B.P., 20:9149
Kuoppamaeki, R., *See* Yli-Juuti, E., 20:8468
Kupfer, M.J., Strategy for sampling Hanford Site tank wastes for development of disposal technology, 20:7410 (R;US)
Kuraev, E.A., *See* Bratkovskaya, E.L., 20:8801
Kurasawa, T., *See* Slagle, O.D., 20:9124
Kurchaninov, L.L., *See* Golovin, V.M., 20:8368
Kurkela, E., *See* Lind, T., 20:7140
Kush, A.K., *See* Leo, A.J., 20:7941
Kushner, M.J., *See* Rader, D.J., 20:8149
Kushniruk, V.F., *See* Kuznetsov, I.V., 20:8915
Kushpil, V.V., *See* Afanas'ev, S.V., 20:8376
Kuteliya, R.N., *See* Guldamashvili, A.I., 20:8095
Kutner, V.B., *See* Lazarev, Yu.A., 20:8931
Kutsanov, V.A., *See* Uglov, V.V., 20:8096
Kuzay, T.M., *See* Li, Y., 20:8332
Kuzemsky, A.L., Irreducible Greens' Functions method in the theory of highly correlated systems, 20:9021 (R;XA)
On the theory of hole propagation in an antiferromagnetic background, 20:9035 (R;XA)
Kuzli, A.S., The development of WWER monitoring and diagnostic concept, 20:7730 (RA;XA)
Kuzin, A., Measurement of de-excitation γ-rays following the photodisintegration of ^{16}O: a test of the quasi-deuteron model in photonuclear reactions above the GDR, 20:8940 (R;AU)
Kuznetsov, I.V., The Inclusive Energy Spectra of Light Charged Particles (p, d, t, ^4He) from Spontaneous Fission of ^{248}Cm, 20:8915 (RA;XJ;In Russian)
Kuznetsov, V.V., *See* Sehrehehtehr, Zh., 20:8383
Kuznietz, M., Coexistence of three commensurate magnetic phases in the solid solution $U(Ni_{0.25}Cu_{0.75})_2Si_2$, observed by neutron diffraction, 20:8082 (RA;IL)
Magnetic ordering in $(U_{0.5}Tb_{0.5})Co_2Ge_2$, studies by ac-susceptibility and neutron-diffraction measurements, 20:8983 (RA;IL)
Magnetic properties of $U(Ni_{1-x}Cu_x)_2Si_2$ solid solutions in the vicinity of x = 0.5 studied by neutron diffraction and ac-susceptibility, 20:8121 (RA;IL)
Neutron diffraction and ac-susceptibility studies of the $U(Ni_{1-x}Cu_x)_2Si_2$ system, 20:8122 (RA;IL)
UCoNiGe$_2$ nonmagnetic solid solution of the antiferromagnets UCo_2Ge_2 and UNi_2Ge_2, 20:8081 (RA;IL)
Kwak, H.Y., *See* Kang, Y.H., 20:7968
See Lim, S.H., 20:7972
Kwak, Ho Sang, *See* Seok, Ho Cheon, 20:7673
Kwan, K.K., *See* Yang, J.H., 20:7830
Kwan, S., *See* Anderson, D.F., 20:8347
Kweller, E., Part I - Oil heat technology research and development. Part II - NAECA 2002, what, when, and who?, 20:7947 (RA;US)
Kwiatkowski, D.J., Report on the Second International Workshop on Human Chromosome 9, 20:8573 (R;US)
Kwon, C.H., Study of new technology of W/O emulsion for compression ignition diesel engine, 20:7572 (R;KR;In Korean)
Study on the CNG storage method using activated adsorbent and CNG combustion technology for vehicles, 20:8012 (R;KR;In Korean)
See Ko, C.J., 20:8013
See Shin, H.S., 20:7977
Kwon, Kee Choon, The construction of environments for development of test and verification technology -The development of advanced instrumentation and control technology-, 20:8337 (R;KR;In Korean)
See Ham, Chang Shik, 20:8336
Kwon, O.S., *See* Ko, C.J., 20:8013
See Kwon, C.H., 20:7572, 20:8012
See Shin, H.S., 20:7977
Kwon, Sang Un, *See* Hwang, Sung Tai, 20:7678
Kwon, Seon Chil, *See* Hong, Gyee Won, 20:9038
Kwon, Seon Kil, *See* Hwang, Sung Tai, 20:7678
See Yoo, Jae Hyeong, 20:8188
Kwon, Sung Ok, *See* Kim, Chul Jung, 20:8702

L

L, *See* Seok, Ho Cheon, 20:7669
La Barre, T.L., *See* Allison, J.W., 20:8242
Laaksonen, A., Polar stratospheric cloud formation: Nucleation and freezing mechanisms of nitric acid and sulphuric acid aerosols, 20:8443 (RA;FI)
See Korhonen, P., 20:8442
Labarca, R., Bifurcations of contracting singular cycles, 20:8666 (R;XA)

LaChance, J.L., *See* Dingman, S.E., 20:7649
Laciak, D.V., Development of novel active transport membrande devices, 20:8139 (R;US)
Ladygin, V.P., Polarization Observables for the Collinear dp → ^{3}Heπ^0 Reaction, 20:8927 (R;XJ)
Ladygina, N.B., *See* Ladygin, V.P., 20:8927
Laemmer, H., *See* Ritter, B., 20:7805
Laevemann, E., High density energy storage for desiccant cooling systems, 20:8001 (RA;US)
Laflamme, R., *See* Dunn, A.M., 20:8703
Lagasse, R.R., High surface area, high permeability carbon monoliths, 20:8146 (R;US)
Lal, M., *See* Pember, R.B., 20:8220
Laichter, Y., *See* Levinson, S., 20:9190
Lambert, C.R., *See* Knapp, F.F. Jr., 20:8218
Lambert, D.J., Study of bb̄ production in e^+e^- annihilation at $\sqrt{s}$ = 29 GeV with the aid of neural networks, 20:8803 (R;US)
Lamberts, W.M., 1,1,1,4,4,4 Hexafluorobutane, a new non-ozone-depleting blowing agent for rigid PUR foams, 20:8032 (RA;US)
See Ball, E.E., 20:8033
Lamehi-Rashti, M., Physics and archaeology an application of nuclear analytical technique, 20:8164 (IA;IR;In English, Persian)
Landau, A., *See* Dayan, D., 20:8087
Landsberg, L.G., Search for exotic baryons with the SPHINX facility, 20:8832 (R;RU)
Landua, R., *See* Hamann, N., 20:8819
Langevin, M.J., Interim essential and support drawing list for K Basins, 20:7284 (R;US)
Langhorst, G.J., *See* Nyhan, J.W., 20:8238
Lanni, C., *See* Foerster, C.L., 20:8333
Lanning, D.D., *See* Gilbert, E.R., 20:7666
Lanskij, I.M., On the paraxial equilibrium of the finite β plasma in open magnetic configurations, 20:9041 (R;RU)
Laplaze, D., *See* Youm, I., 20:8977
Larbalestier, D.C., *See* Parrell, J.A., 20:8115
Larsen, G.C., Verification of design basis 2 - a coupled aeroelastic wind turbine model, 20:7624 (R;DK)
Lassesson, B., The development of diagnostic techniques for the spark discharge and the flame characteristics, applied in a lean burn spark ignition engine to examine the relations between the spark discharge, the flame, the heat release and the fluid flow, 20:8059 (R;SE)
Lassig, C.C., Phenomenology of the two Higgs doublet sector of a quark-lepton symmetric model, 20:8775 (R;AU)
Last, I., Three-dimensional reactive quantum mechanical study for the H_2+X_2 (X=H,D,T) systems. Application of negative imaginary arrangement decoupling potentials, 20:8186 (RA;IL)
See Baer, M., 20:8185
See Baram, A., 20:8184
See Gillbert, M., 20:8183
See Szichman, H., 20:8962
Latif, Z., *See* Sajjad, M.I., 20:8174
Lauerhass, L., *See* Knutson, B.J., 20:7371
Laurens, R.M., Overview of MCFC commercialization strategy, 20:7939 (RA;US)
Laurinat, J.E., Mass transfer model for two-layer TBP oxidation reactions, 20:7437 (R;US)
Lavine, T., *See* Wang, J.W., 20:8328
Law, A.G., *See* Johnson, V.G., 20:7455
Lawrence, C., Toward the unification of sequence and structural data for identification of structural and functional constraints, 20:8560 (RA;US)
Lawrence, L.A., *See* Makenas, B.J., 20:7372
Lazarev, Yu.A., Spontaneous Fission of Light Californium Isotopes Produced in the ^{206,207,208}Pb + ^{34,36}S Reactions; New Nuclide ^{238}Cf, 20:8931 (R;XJ)
Lazaridis, M., *See* Jokiniemi, J.K., 20:7180
Lazeev, B.N., *See* Buchel'nikova, N.S., 20:9056, 20:9057, 20:9061, 20:9062, 20:9063, 20:9064
Le Priol, J., *See* Faye, A., 20:8485
Leal, L.E., *See* Deen, J.R., 20:7761
Lebedev, R.M., *See* Glagolev, V.V., 20:8934
LeBlanc, B., Active core profile and transport modification by application of Ion Bernstein Wave power in PBX-M, 20:9076 (R;US)
See Ono, M., 20:9086
Ledvij, M., Dependence of the Josephson coupling of unconventional superconductors on the properties of the tunneling barrier, 20:9027 (R;US)
Lee Chengchung, Alloying effects of Kondo insulators, 20:8976 (R;XA)
Antiferromagnetic instability of heavy-fermion alloys with conduction band impurities, 20:8975 (R;XA)
Lee Jong Po, *See* Lee, Sam Lai, 20:7660
Lee, B.D., *See* Shin, D.Y., 20:8237
Lee, B.S., *See* Oh, C.S., 20:7976
See Shin, H.S., 20:7977
Lee, Bo Uk, *See* Seok, Ho Cheon, 20:7673
Lee, Bong Sang, *See* Hong, Jun Hwa, 20:8099, 20:8263
Lee, Byeong Cheol, *See* Lee, Jong Min, 20:8232, 20:8293
Lee, Byeong Doo, *See* Park, Hyeon Soo, 20:7510
Lee, Byeong Ryeong, *See* Chung, Moon Kyu, 20:7655
Lee, Byeong Uk, *See* Choi, Young Myung, 20:9143
See Oh, Keun Bae, 20:9141
Lee, Byoung Soen, *See* Kim, Yong, 20:9139
Lee, Byung Cheol, *See* Lee, Jong Min, 20:8169, 20:8231
Lee, Byung Chul, *See* Kim, Chul Jung, 20:8702
Lee, Byung Doo, *See* Hong, Jong Sook, 20:7509
Lee, Byung Sun, *See* Ham, Chang Shik, 20:8336
See Kwon, Kee Choon, 20:8337
See Moon, Byung Soo, 20:7749
Lee, C.H., A study on the optimum operation methodology of small hydro power plants(I), 20:7978 (R;KR;In Korean)
Modeling of single char combustion, including CO oxidation in its boundary layer, 20:7170 (R;US)
Lee, Chang Hee, *See* Kim, Huhn Jun, 20:8391
Lee, Chang Ho, *See* Chang, Jong Hwa, 20:7662
Lee, Chang Kun, *See* Chang, Jong Hwa, 20:9193
Lee, Chang Soo, *See* Kwon, Kee Choon, 20:8337
Lee, Chang Tak, *See* Kang, Young Ho, 20:8100
Lee, Chang Uh, *See* Lee, Jeong Ho, 20:8618, 20:8622
Lee, Chang Woo, Environmental radiation monitoring around the research reactors, 20:8619 (R;KR;In Korean)
See Lee, Jae Kyung, 20:7659
Lee, D.W., *See* Yang, Y.S., 20:7969
Lee, Dae Hee, *See* Seok, Ho Cheon, 20:7673
Lee, Deok Hyun, *See* Kim, Uh Chul, 20:8264
Lee, Deuk Soo, *See* Seok, Ho Cheon, 20:7673
Lee, Don Bae, *See* Kim, Chang Kyu, 20:7772
Lee, Dong Han, *See* Ji, Young Hoon, 20:8389
Lee, Dong Hoon, *See* Chae, Jong Seo, 20:8325
Lee, Dong Jin, *See* Cho, Man, 20:7677
See Choi, Young Myung, 20:9146
See Kim, Hwa Sup: Yang, Maeng Ho, 20:7883
See Kim, Yong, 20:9139
See Yang, Maeng Ho, 20:9140
Lee, Dong Young, *See* Ham, Chang Shik, 20:8336
Lee, E., Elise - the next step in development of induction heavy ion drivers for inertial fusion energy, 20:9123 (R;US)
Lee, E.K., *See* Noh, D.S., 20:7258
Lee, E.S., The design and evaluation of integrated envelope and lighting control strategies for commercial buildings, 20:7981 (R;US)
Lee, Eu Jin, *See* Lee, Jung Woon, 20:9145
Lee, Eun Hee, *See* Kim, Uh Chul, 20:7694, 20:8264
See Yang, Kyung Rin, 20:7661
Lee, H.K., Development of high efficient process for simultaneous removal of SOx and NOx from flue gas (III), 20:7970 (R;KR;In Korean)
See Son, J.I., 20:8457
Lee, Hae Joon, *See* Chung, Moon Kyu, 20:7655
Lee, Han Myeong, *See* Chun, Kwan Sik, 20:7518
See Park, Hyun Soo, 20:7672
See Song, Ki Dong, 20:7860
Lee, Han Soo, *See* Chun, Kwan Sik, 20:7518
See Chung, Heung Seok, 20:7515, 20:7517
See Sung, Ki Woung, 20:8171
Lee, Han Yeong, *See* Lee, Jung Woon, 20:9145
Lee, Han Young, Development of training courses in the field of nuclear energy, 20:9199 (R;KR;In Korean)

See Kim, Yong, 20:9139
Lee, Hee Seong, *See* Sohn, Dong Seong, 20:7704
Lee, Ho Jin, *See* Hong, Gyee Won, 20:9038
Lee, Hu Keun, *See* Park, Hyeon Soo, 20:7320
Lee, Hul Gyun, *See* Hong, Gyee Won, 20:9038
Lee, Hyeong Deok, *See* Lee, Jeong Ho, 20:8622
Lee, Hyeong Yeon, *See* Yoo, Bong, 20:7696
Lee, Hyoung-Koo, *See* Hong, Wan-Shick, 20:8393
Lee, Hyun Chul, *See* Sim, Bong Shick, 20:7750
Lee, Hyun Duk, *See* Lee, Chang Woo, 20:8619
See Lee, Jeong Ho, 20:8618
Lee, Il Hee, *See* Yoo, Jae Hyeong, 20:8188
Lee, J.P., *See* Park, S.C., 20:7540
Lee, J.S., *See* Choi, I.S., 20:7971
See Lee, H.K., 20:7970
See Park, S.C., 20:7540
Lee, Jae Cheol, *See* Kim, Jae Hee, 20:7695
See Kim, Jae Hui, 20:7748
Lee, Jae Gyeong, *See* Kim, Seung Ho, 20:8236
Lee, Jae Han, *See* Yoo, Bong, 20:7696
Lee, Jae Kyeong, *See* Kim, Chang Kyu, 20:7772
See Sohn, Dong Seong, 20:7704
Lee, Jae Kyung, Development of debris resistant bottom end piece, 20:7659 (R;KR;In Korean)
Lee, Jae Seol, *See* Park, Hyun Soo, 20:7672
Lee, Jae Seong, *See* Choi, Young Myung, 20:9143
See Oh, Keun Bae, 20:9141
Lee, Jang Soo, *See* Ham, Chang Shik, 20:8336
See Kim, Jae Hee, 20:7695
See Kim, Jae Hui, 20:7748
Lee, Jeong Ho, Environmental radiation monitoring around the research reactors, 20:8618 (R;KR;In Korean)
Environmental radiation monitoring and terrestrial radioecology -A study on the radiation and environmental safety-, 20:8622 (R;KR;In Korean)
Lee, Jeong Soo, *See* Kim, Huhn Jun, 20:8391
Lee, Jeong Won, *See* Yang, Myeong Seung, 20:7668
Lee, Jeong Yang, *See* Seok, Ho Cheon, 20:7673
Lee, Jeong Yeong, *See* Kim, Yong Seong, 20:7773
Lee, Ji Bok, Development of the radioisotope production facility for the KMRR -Studies on application of radiation and radioisotopes-, 20:7774 (R;KR;In Korean)
See Kim, Jae Rok, 20:8602
Lee, Ji Ho, Development of technical information processing systems, 20:9192 (R;KR;In Korean)
Lee, Ji Seop, *See* Chae, Jong Seo, 20:8325
Lee, Jong Bok, *See* Kang, Shin Bok, 20:9167
See Kang, Sin Bok, 20:9144
Lee, Jong Min, Development of atomic spectroscopy technology, 20:8169 (R;KR;In Korean)
Development of high power free-electron lasers, 20:8232 (R;KR;In Korean)
Development of high power free-electron lasers, 20:8293 (R;KR;In Korean)
Development of laser technology (Development of the wavelength tuning and the output stabilization technology), 20:8231 (R;KR;In Korean)
Development of the separation and manufacturing technology for medical and industrial stable isotopes by using laser, 20:7516 (R;KR;In Korean)
The development of advanced robotic technology -The development of advanced robotics for the nuclear industry-, 20:8235 (R;KR;In Korean)
See Kim, Chul Jung, 20:8702
See Kim, Seung Ho, 20:8230
Lee, Jong Tak, *See* Kim, Chang Kyu, 20:7772
Lee, Jun, *See* Yoo, Geun Jong, 20:8252
Lee, Jung Woon, The development of human behaviour analysis techniques -The development of human factors technologies-, 20:9145 (R;KR;In Korean)
Lee, Kang Il, *See* Kang, Young Ho, 20:8100
Lee, Kang Seok, *See* Kim, Sang Bok, 20:8625
Lee, Kang Suk, Development of technology for biological dosimetry -A study on the radiation and environmental safety-, 20:8590 (R;KR;In Korean)
See Choi, Young Myung, 20:9146
Lee, Ki Bok, *See* Chang, Jong Hwa, 20:7662
Lee, Ki Chang, *See* Chang, Si Young, 20:8623
Lee, Ki Un, *See* Yoo, Jang Ryoel, 20:8603
Lee, Ki Woon, *See* Lee, Young Il, 20:8624
Lee, Kwang Seok, *See* Choi, Young Myung, 20:9143
See Oh, Keun Bae, 20:9141
Lee, Kwang Won, Development of tokamak experiment technology - A study on the nuclear fusion reactor-, 20:9106 (R;KR;In Korean)
See Hwang, Churl Kew, 20:9068
See In, Sang Ryul, 20:9107
Lee, Kyeong Ho, *See* Seok, Ho Cheon, 20:7673
Lee, Kyu Il, *See* Park, Jin Ho, 20:8621
Lee, L.K., *See* Comolli, A.G., 20:7134
Lee, Man Kee, *See* Song, Ki Dong, 20:7860
Lee, Min Yong, *See* Chae, Jong Seo, 20:8325
Lee, Myeon Joo, A study on the treatment of non-biodegrable wastewater by using radiation, 20:8211 (R;KR;In Korean)
See Lee, Chang Woo, 20:8619
See Lee, Jeong Ho, 20:8618, 20:8622
Lee, Myeong Ho, *See* Lee, Chang Woo, 20:8619
See Lee, Jeong Ho, 20:8622
Lee, Myeong Hun, *See* Kim, Se Chang, 20:7658
Lee, Myoung Ho, *See* Lee, Jeong Ho, 20:8618
Lee, N.H., *See* Kang, Y.H., 20:7968
See Lim, S.H., 20:7972
Lee, Pan Kwon, *See* Chung, Moon Kyu, 20:7655
Lee, R.N., *See* Zemanian, T.S., 20:8464
Lee, S.A., Measurement of the magnetically-induced QED birefringence of the vacuum and an improved search for laboratory axions: Technical report. Project definition study of the use of assets and facilities of the Superconducting Super Collider Laboratory, 20:8754 (R;US)
Lee, S.G., *See* Shin, H.S., 20:7977
Lee, S.H., *See* Sim, K.S., 20:7535
See Son, E.K., 20:7142
Lee, S.K., *See* Shin, D.Y., 20:8237
Lee, S.L., A note on the total least squares problem for coplanar points, 20:9182 (R;US)
Bounds for departure from normality and the Frobenius norm of matrix eigenvalues, 20:9183 (R;US)
Lee, S.M., *See* Jeon, H.S., 20:7966
Lee, Sam Lai, Development of detection technique for fatigue crack due to thermal stratification phenomena in RCS piping, 20:7660 (R;KR;In Korean)
Lee, Sang Jae, *See* Lee, Young Il, 20:8624
See Yoo, Jang Ryoel, 20:8603
Lee, Sang Yong, *See* Chang, Won Pyo, 20:7664
See Seok, Ho Cheon, 20:7669
Lee, Sang Yoon, *See* Chang, Si Young, 20:8623
Lee, Seong Ho, *See* Kim, Yong Seong, 20:7773
Lee, Seong Jae, *See* Chang, Won Pyo, 20:9169
See Yoo, Kun Joong, 20:7665
Lee, Seong Koo, *See* Ji, Young Hoon, 20:8389
Lee, Seung Hee, *See* Lee, Jung Woon, 20:9145
Lee, Soo Cheol, *See* Choi, Chang Beom, 20:7671
Lee, Soo Ho, *See* Kim, Jeong Moog, 20:8233
See Shin, Jang Soo, 20:8388
Lee, Sueng Hee, *See* Kim, Yong, 20:9139
Lee, T.K., *See* Jeon, H.S., 20:7966
See Kim, D.H., 20:7973
See Son, Y.M., 20:8456
Lee, T.S.H., Electromagnetic production of pions on the nucleon, 20:8778 (R;US)
Lee, Tae Yeong, *See* Chang, Si Young, 20:8623
Lee, Uei Jin, *See* Kim, Yong, 20:9139
Lee, Ui Jin, *See* Lee, Han Young, 20:9199
Lee, Ui Joo, *See* Seok, Ho Cheon, 20:7669
Lee, W.S., *See* Lee, H.K., 20:7970
Lee, W.Y., *See* Shin, D.Y., 20:8237
Lee, Won Koo, *See* Kim, Yong, 20:9139

Lee, Won Kyeong, *See* Yoo, Jae Hyeong, 20:8188
Lee, Won Yoon, *See* Lee, Chang Woo, 20:8619
See Lee, Jeong Ho, 20:8618, 20:8622
Lee, Y.J., *See* Ko, C.J., 20:8013
See Kwon, C.H., 20:7572, 20:8012
See Shin, H.S., 20:7977
Lee, Y.Y., *See* Alessi, J.G., 20:8283
Lee, Yeong Ill, *See* Kim, Jae Rok, 20:8602
Lee, Yeong Il, *See* Yoo, Jang Ryoel, 20:8603
Lee, Yeong Jin, *See* Chang, Won Pyo, 20:7664
See Seok, Ho Cheon, 20:7669
Lee, Yeong Keun, *See* Chun, Kwan Sik, 20:7755
See Jin, Joon Ha, 20:7522, 20:7523
Lee, Yeong Kl, *See* Song, Ki Dong, 20:7860
Lee, Yeong Uh, *See* Sohn, Dong Seong, 20:7704
See Yang, Myeong Seung, 20:7668
Lee, Yeong Uk, *See* Seok, Ho Cheon, 20:7669, 20:7673
Lee, Yong Bum, *See* Kim, Seung Ho, 20:8230, 20:8236
See Lee, Jong Min, 20:8235
Lee, Yong Deok, *See* Park, Hyeon Soo, 20:7510
Lee, Yong Hee, *See* Lee, Jung Woon, 20:9145
Lee, Yong Min, *See* Chae, Jong Seo, 20:8325
Lee, Yoon Hwan, *See* Kim, Sang Bok, 20:8625
See Yoon, Myoung Hwan, 20:8170
See Yoon, Myung Hwan, 20:8189
Lee, Young Bok, Site selection of meteorological tower and environmental impact assessment of the cooling tower, 20:7754 (R;KR;In Korean)
See Han, Moon Hee, 20:8620
See Kim, Byung Woo, 20:9142
Lee, Young Il, Studies on the radiation application for the development of genetic resources -Studies on application of radiation and radioisotopes-, 20:8624 (R;KR;In Korean)
Lee, Young Jae, *See* Kang, Shin Bok, 20:9167
Lee, Young Joo, *See* Lee, Jong Min, 20:8169
Lee, Young Kwang, *See* Kim, Seung Ho, 20:8236
See Lee, Jong Min, 20:8235
Lee, Young Ook, *See* Rhee, Bo Wook, 20:7683
Leffke, A., *See* Schreiber, G.A., 20:8601
Lehnert, B., Vertical displacement and position control in tokamaks, 20:9069 (R;SE)
Lehtinen, K., *See* Hautanen, J., 20:8441
Lehtinen, K.E.J., Theoretical studies on electrical agglomeration of a bimodal aerosol, 20:8440 (RA;FI)
See Jokiniemi, J.K., 20:7180
Leigh, B., Plutonium production and storage at BNFL Sellafield, United Kingdom, 20:7277 (RA;XA)
Leijstroem, H., Relining of pipelines for natural gas distribution (Swage-lining), 20:8265 (R;SE;In Swedish)
Leira, B.J., *See* Sotberg, T., 20:7245
Leistikow, S., Post-test examination and evaluation of the CORA experiments. Contribution to the evaluation of the CORA-W1 test bundle, 20:7813 (RA;DE;In German)
Lelovic, M., *See* Krishnaraj, P., 20:8114
Lemon, D.K., The AMTEX Partnership™. Fourth quarter report, September 1994, 20:7877 (R;US)
Lempert, G.D., *See* Zalkind, S., 20:8086
Leo, A.J., Status of Santa Clara MCFC product development test, 20:7941 (RA;US)
Leonard, J.W., *See* Parekh, B.K., 20:7137
Leonard, R.A., Basic TRUEX process for Rocky Flats Plant, 20:7289 (R;US)
Leont'ev, A.V., *See* Grigor'ev, V.V., 20:9006
Leont'ev, V.V., Combined calculation of in-pile experimental devices by the Monte Carlo method, 20:7688 (R;RU;In Russian)
Lerch, P., *See* Blatter, J., 20:9032
Lerman, L.S., [Cloning-idependent mapping technology for genomic fidelity, contig linking, C-DNA site analysis, and gene detection]. Final report, 20:8582 (R;US)
Leskovar, M., *See* Stritar, A., 20:7641
Lestelle, L.C., Ecosystem diagnosis and treatment planning model as applied to supplementation. Model description, user guide, and theoretical documentation for the model introduce in the summary report series on supplementation in the Columbia basin, 20:8523 (R;US)
Leung, K., *See* Suuberg, E.M., 20:7087
Levin, B.F., Robotic weld overlay coatings for erosion control. Quarterly technical progress report, July–September, 1994, 20:8078 (R;US)
Levin, L.A., *See* Levron, D., 20:8954
Levine, D.A., Data summary for the near-shore sediment characterization task of the Clinch River Environmental Restoration Program, 20:7483 (R;US)
Levine, M.D., *See* Liu Zhiping, 20:8027
Levine, T., *See* Walter, K.C., 20:9012
Levinson, A., *See* Akkerman, A., 20:8405
Levinson, J., New insight into proton-induced latchup. Experiments and modelling, 20:8404 (RA;IL)
See Barak, J., 20:8406
See Ilberg, D., 20:8408
See Lifshitz, Y., 20:8407
See Shappir, J., 20:8403
Levinson, S., A computerized data-base system foe personal internal contamination results, 20:9190 (RA;IL)
A manual sample changer for a 5 inch proportional detector counting system, 20:8364 (RA;IL)
A quick quantitative evaluation of a specific radio nuclide from 'Nucleus Pulse Spectrum Analysis' spectra, 20:8362 (RA;IL)
A square 7.5 inch proportional guard detector, 20:8363 (RA;IL)
See Pelled, O., 20:8361
Levron, D., Photon flux optimization in three-color multiphoton ionization of uranium atoms, 20:8954 (RA;IL)
Levy, S.C., Recent advances in lithium ion technology, 20:7833 (R;US)
Lewis, B.R., *See* Dodd, B., 20:7765
Lewis, J.A., *See* Guo, J., 20:8113
Lewis, R.E., A survey of existing and emerging technologies for external detection of liquid leaks at the Hanford Site, 20:7340 (R;US)
Lewitowicz, M., Identification of the Doubly Magic Nucleus ^{100}Sn in the Reaction ^{112}Sn (63 MeV/Nucleon) + ^{nat} Ni, 20:8914 (RA;XJ)
Ley, K.L., *See* Krumpelt, M., 20:7930
Li Jianming, *See* Guo Hanying, 20:8723
Li Kehua, *See* Luo Cuixian, 20:9043
Li Zhongzhen, *See* Wan Yude, 20:8343
Li, H., Design study of beam dynamics issues for 1 TeV next linear collider based upon the relativistic-klystron two-beam accelerator, 20:8304 (R;US)
Design study of longitudinal dynamics of the drive beam in 1 TeV relativistic klystron two-beam accelerator, 20:8303 (R;US)
Li, J.C.M., Microstructural behavior of nonequilibrium systems. Final report, March 1, 1986–May 31, 1993, 20:8069 (R;US)
Li, Y., X-ray photoelectron spectroscopy analysis of cleaning procedures for synchrotron radiation beamline materials at the Advanced Photon Source, 20:8332 (R;US)
Liang qichang, Evaluation of neutron nuclear data of ^{239}Pu for CENDL-2, 20:8891 (RA;CN)
Liang Qichang, The establishment of EXFOR nuclear data based system and experimental neutron data library, 20:8873 (RA;CN)
The summary for recommended data of natural Zn, ^{232}Th and ^{235}U for CENDL-2, 20:8896 (RA;CN)
Liang, H., *See* Gee, J.M., 20:7591
Liaquat, L.A., Neutronic analysis for upgradation of Pakistan Research Reactor-1 from 9 to 10 MW, 20:7776 (R;PK)
Lichatowich, J.A., *See* Lestelle, L.C., 20:8523
Liepmann, M.J., Gamma radiation effects on some optical glasses, 20:8402 (RA;IL)
Lifshitz, Y., A portable planar ^{90}Sr irradiation setup for total dose testing of electronic devices, 20:8407 (RA;IL)
See Akkerman, A., 20:8405
See Barak, J., 20:8406
See Ilberg, D., 20:8408
See Levinson, J., 20:8404
Lilly, W.D., *See* Suuberg, E.M., 20:7087, 20:7115, 20:7116, 20:7117, 20:7118, 20:7119, 20:7120, 20:7121
Lim, Chang H, *See* Lee, Jong Min, 20:7516
Lim, Chang Hwan, *See* Kim, Chul Jung, 20:8702
See Lee, Jong Min, 20:8231, 20:8293

Lim, Chang Saeng, *See* Park, Hyun Soo, 20:7672
Lim, Dae Ho, *See* Hong, Gyee Won, 20:9038
Lim, In Cheol, *See* Kim, Chang Kyu, 20:7772
Lim, Jae Kwan, *See* Yoo, Jae Hyeong, 20:8188
Lim, Kap Soon, *See* Sohn, Dong Seong, 20:7704
Lim, Kyeo, *See* Kim, Chang Kyu, 20:7772
Lim, Moon Ho, *See* Lee, Chang Woo, 20:8619
See Lee, Jeong Ho, 20:8618, 20:8622
Lim, S.H., Study on the environment of passive solar schoolrooms (II), 20:7972 (R;KR;In Korean)
See Kang, Y.H., 20:7968
Lim, Tae Jin, *See* Yoo, Keon Joong, 20:7657
Lim, Y.J., *See* Son, E.K., 20:7142
Lim, Yong Taek, *See* Lee, Young Il, 20:8624
Lim, Yong Taek, *See* Yoo, Jang Ryoel, 20:8603
Limberg, T., *See* Emma, P., 20:8306
Lin, Pengju, *See* Kasukabe, Y., 20:8151
Lind, T., Aerosol particle characteristics from pressurised fluidised bed coal gasification, 20:7140 (RA;FI)
Real scale studies on alkali metal transformations in atmospheric CFBC of coal, 20:7181 (RA;FI)
Lindbom, B., *See* Grundfelt, B., 20:7362
Lindemuth, I.R., Magnetized target fusion: An ultra high energy approach in an unexplored parameter space, 20·9070 (R;US)
Lindgren, E.R., In situ electrokinetic control of moisture and nutrients in unsaturated soils, 20:7488 (R;US)
Lindquist, D., *See* Mazumder, M.K., 20:7099
Linehan, J.C., *See* Matson, D.W., 20:7231
Liner, C., *See* Kelkar, M.G., 20:7213
Linnik, V.A., Thermodynamical optimization of the space power plants on the base of criterion of specific mass in generalized design variables, 20:7679 (R;RU;In Russian)
Linschooten, C.G., Test report – Prototype core sampler, 20:7421 (R;US)
Lister, J.B., Variable configuration plasmas in TCV, 20:9072 (RA;CH)
Litt, R.D., *See* Jones, E.O., 20:8038
Littlefield, L.G., *See* Frome, E.L., 20:8644
Liu Jianfeng, *See* Liu Tingjin, 20:8882
Liu Mantian, *See* Peng Xiufeng, 20:8905
Liu Qiusheng, China's nuclear power programme and the projected production and consumption of plutonium, 20:7266 (RA;XA)
Liu Ruizhe, Computer program library at CNDC, 20:9157 (RA;CN)
Liu Tingjin, Covariance data evaluation for experimental data, 20:9158 (RA;CN)
The evaluation of oxygen complete neutron data for CENDL-2, 20:8882 (RA;CN)
Liu Tong, *See* Zhou Delin, 20:8893, 20:8894, 20:8895
Liu Yunchang, The evaluation of Mn data for 10^{-5} eV to 20 MeV neutrons, 20:8886 (RA;CN)
Liu Yushan, *See* Luo Cuixian, 20:9043
Liu Yuzhang, *See* Zhao Yunlong, 20:8342
Liu Zhiping, Industrial sector energy conservation programs in the People's Republic of China during the seventh five-year plan (1986–1990), 20:8027 (R;US)
Liu, C., *See* Li, Y., 20:8332
Livingston, R.R., *See* O'Rourke, P.E., 20:8412
See Wicks, G.G., 20:8172
Livne, Z., *See* Dayan, D., 20:8087
Ljungstroem, M., Beech (Fagus sylvatica) seedling growth and nutrition - effects of acid soils and liming, 20:8643 (R;SE)
Lloyd, W.G., *See* Pan, Wei-Ping, 20:7179
Lodhi, N.P.K., *See* Aziz, A., 20:7778
Loeffler, F., High temperature gas filtration, 20:7636 (RA;FI)
Loehman, R.E., *See* Turman, B.N., 20:8130
Loensjoe, H., *See* Eriksson, Aake, 20:8634
Loesch, H.J., *See* Baer, M., 20:8185
Loesch, R.M., *See* McDonald, J.C., 20:8395
Loew, G.A., *See* Wang, J.W., 20:8328
Loewen, R., *See* Wang, J.W., 20:8328
Loghry, S.L., *See* Salmon, R., 20:7336
Loida, A., *See* Grambow, B., 20:8126
Lomax, J.D., Green River Formation water flood demonstration project, Uinta Basin, Utah. Quarterly technical progress report, July 1–September 30, 1994, 20:7216 (R;US)
Lomdahl, P.S., *See* Beazley, D.M., 20:9177
Long Xianguan, *See* Peng Xiufeng, 20:8905
Longaker, T.M., *See* Pool, K.N., 20:7398
Longevialle, H. de, *See* Gerster, D., 20:7267
Longwell, J.P., *See* Lee, C.H., 20:7170
Loomis, B.A., *See* Chung, H.M., 20:8070, 20:9093
Loose, R.R., *See* Thresher, R.W., 20:7620
Lopatin, V.V., *See* Kabyshev, A.V., 20:8124
Lopatkin, A.V., *See* Oriov, V.V., 20:7355
Lopez, A., Advanced sulfur control concepts in hot-gas desulfurization technology: Phase 1, Feasibility of the direct production of elemental sulfur during the regeneration of high temperature desulfurization sorbents, 20:7107 (R;US)
Lopez, R., *See* Zaldivar, M.E., 20:8206
Lopez-Reyes, C., *See* Martinez-Lugo, R., 20:8162
Lorentzen, G., Application of "natural" refrigerants: New system concepts for the use of CO_2, 20:8016 (RA;US)
Lorenzetto, P., *See* Billone, M.C., 20:7674
Lorsch, H.G., *See* Cho, Y.I., 20:8249
Loskot, C.L., *See* Blout, D.O., 20:7366
Lott, J.A., *See* Bryan, R.P., 20:8272
Lott, K.E., *See* DeVore, J.R., 20:7484
Lotz, H., The conversion of German household-appliance refrigeration industry from CFC's to hydrocarbons and fluorocarbons in 1993, 20:8003 (RA;US)
Loukola, E., *See* Shuibo, Pan, 20:7582
Louvat, D., *See* Aranyossy, J.F., 20:8478
Loy, D.A., *See* Myers, S.A., 20:8175
Loyalka, S.K., *See* Boyack, B.E., 20:7817
Lu Jingju, *See* Huang Fuduan, 20:8609
Lu Zhongdao, Diffusion process of nuclear fission, 20:8900 (RA;CN)
Theoretical progress at CNDC theory group, 20:8871 (RA;CN)
Lu, A., *See* Aston, D., 20:8401
Lu, J., *See* Carlisle, N., 20:7586
Lucas, B.N., Time dependent indentation testing at non-ambient temperatures utilizing the high temperature mechanical properties microprobe, 20:8076 (R;US)
Lucas, P., *See* Gerster, D., 20:7267
Lucas, R.G., *See* Conover, D.R., 20:8008
See Klevgard, L.A., 20:8007
Luce, T.C., Experimental constraints on transport, 20:9048 (R;US)
Lueth, V., BABAR - the detector for the PEP II B Factory at SLAC, 20:8399 (R;US)
Lui, A., *See* Rockey, J.M., 20:7108
Lui, E., *See* Matson, D.W., 20:7231
Lujan, R.D., New novel cleaning technique for extending mean time between mechanical cleans in a Genus tungsten CVD reactor, 20:8106 (R;US)
Luk'yanov, V.K., Nuclear Distorted Waves in High-Energy Approximation, 20:8877 (R;XJ)
Quasi-Classical Description of Heavy Ion Reactions, 20:8876 (R;XJ)
Lukstin'sh, Yu., *See* Aksinenko, V.D., 20:8387
Lummer, M., *See* Arnecke, G., 20:7803
Lun, D.R., Determination of scattering amplitudes from differential cross section data by using unitarity conditions, 20:8878 (R;AU)
Inversion of the total cross sections for electron-molecule and electron-atom scattering, 20:8964 (R;AU)
Lund, I., *See* Gudbjerg, E., 20:8029
Lundgaard, N., *See* Gudbjerg, E., 20:8029
Lundqvist, P.G., Stirling cycle refrigerators and heat pumps, 20:7997 (RA;US)
Luo Chenglin, The effects of H^+ implants on $YBa_2Cu_3O_7$ superconducting materials, 20:9028 (R;CN;In Chinese)
Luo Cuixian, Study of impurity concentrations by VUV spectroscopy on HL-1, 20:9043 (R;CN)
Luo, H., *See* Knapp, F.F. Jr., 20:8218
Lupton, L.R., *See* Jones, P.E.R., 20:7715
Lushnikov, A.A., *See* Vesala, T., 20:8438
Lusk, E., *See* Gropp, W., 20:9154
Lusk, P., Methane recovery from animal manures: A current opportunities casebook, 20:7552 (R;US)
Luttrell, G., *See* Yoon, R.H., 20:7097, 20:7135
Lutz, J., *See* Turiel, I., 20:7982
Lutz, R.N., *See* Boettinger, W.L., 20:7428

Lux, I., *See* Adorjan, F., 20:7713
Lyapin, V.G., *See* Tsvetkov, I.O., 20:8381
Lykou, J., *See* Gudbjerg, E., 20:8029
Lyles, B., Potential hydrologic characterization wells in Amargosa Valley, 20:8473 (R;US)
Lyles, B.F., *See* Chapman, J.B., 20:8472
Lynch, G., *See* Aston, D., 20:8401
Lynch, T.P., *See* Rieksts, G.A., 20:8633
Lyons, J.M., *See* Cunningham, R.E., 20:7242
Lyu, Chan Ho, *See* Ham, Chang Shik, 20:8336
Lyu, Ji Myung, *See* Lee, Kwang Won, 20:9106
Lyudchik, O.R., *See* Bojko, E.B., 20:9001
See Komarov, F.F., 20:9002

M

Ma, J.P., CP violating effects in $e^+ e^- \rightarrow ZH$ and their optimization, 20:8747 (R;AU)
Maayouf, R.M.A., Small Angle Neutron Scattering Facility for Low and High Power Reactors, 20:8947 (R;XJ)
Mabrey, J.B., *See* Suter, G.W. II, 20:8476
Macdonald, Q.C., *See* Thorne, P.D., 20:8512
MacFarlane, R.E., *See* Ingersoll, D.T., 20:7648
Mackamul, K., *See* Duran, G., 20:7583
Macken, C., Evolution on rugged landscapes, 20:8561 (RA;US)
MacKenzie, R., *See* Hendrickson, L., 20:8308
Mackey, H.E. Jr., *See* Bresnaham, P.J., 20:7503
Mackin, G.A., *See* Madden, J.S., 20:8465
Madden, J.S., Radon in dwellings in selected areas of Ireland, 20:8465 (R;IE)
Maekelae, J.M., *See* Mavliev, R., 20:8446
Maekelae, T., *See* Pakkanen, T., 20:8445
Maekinen, H., Availability analysis of a 100 kWh superconducting magnetic energy storage, 20:7827 (R;FI)
Maekinen, M., *See* Lind, T., 20:7181
See Pakkanen, T., 20:8445
Maeng, Wan Young, *See* Ryu, Woo Seong, 20:7693
Maenhaut, W., *See* Lind, T., 20:7181
Mahajan, S.M., *See* Berezhiani, V.I., 20:8722
Mahanama, K.R.R., *See* Daisey, J.M., 20:8461
Maienschein, J.L., *See* Simpson, R.L., 20:8111
Maier-Laxhuber, P., *See* Schwarz, J., 20:7996
Maile, K., *See* Sturm, D., 20:7787
Mainczyk, K., *See* Schreiber, G.A., 20:8601
Maiss, E., *See* Ellenbogen, M., 20:8356
See Mazor, T., 20:8355
Majer, E.L., High resolution seismic imaging of Rainier Mesa using surface reflection and surface to tunnel tomography, 20:8428 (R;US)
See Daley, T.M., 20:7329
See Romero, A.E. Jr., 20:7605
Majumdar, S., Shakedown analysis of fusion reactor first wall, 20:9096 (R;US)
See Bhown, A.S., 20:7635
See Wolters, J., 20:9094
Makenas, B.J., Accelerated characterization of metal fuel stored in the Hanford K basins, 20:7372 (R;US)
Makowski, M.A., *See* Luce, T.C., 20:9048
Maksoudi, M., *See* Aranyossy, J.F., 20:8478
Malakhov, A.I., *See* Afanas'ev, S.V., 20:8376
Malakhov, N.A., *See* Afanas'ev, S.V., 20:8376
Malamud, E., SciTech Clubs for Girls. [Final report], September 1, 1991–April 30, 1994, 20:8654 (R;US)
Malang, S., Target design analysis for an intense T-H_2O neutron source, 20:7528 (IA;DE)
Malesys, P., *See* Renard, C., 20:7280
Malkovsky, V.I., Computer simulation of radionuclide transport through thermal convection of groundwater from borehole repositories, 20:7327 (R;US)
See Pek, A.A., 20:7328
Malm, J., Thermal bar dynamics. Spring thermo- and hydrodynamics in large temperate lakes, 20:8543 (R;SE)
Malmberg, T., *See* Goeller, B., 20:7801
Malone, M.F., *See* Douglas, J.M., 20:8020
Malvache, P., Rex: A methodology used for the structured processing of nuclear power plant operation experience feedback, principles and extension to case based reasoning, 20:7746 (RA;XA)
Maly, P., *See* Adam, J., 20:8384, 20:8385
Manak, I.S., *See* Kononenko, V.K., 20:8694
Mani, T.V., *See* Warrier, K.G.K., 20:8116
Manickam, J., *See* Ono, M., 20:9086
Mann, C.K., Detection and quantitative analysis of ferrocyanide and ferricyanide: FY 93 Florida State University Raman spectroscopy report, 20:8178 (R;US)
Manojlovic, N., Integrals of motion in the two Killing vector reduction of general relativity, 20:8740 (R;AU)
Manour, J., Geological environmental problems in the surroundings of the Olsi uranium deposit, 20:7449 (IA;CZ;In Czech)
Mansour, H.M.M., A study of luminescence and absorption spectra of GaP, 20:8955 (R;XA)
Mar, B., *See* Fofana, A., 20:8533
Maraghechi, B., Analysis of relativistic free electron wave generator by plasma electrodynamics, 20:9051 (IA;IR;In English, Persian)
Marciano, W.J., Tau physics 1994: A theoretical perspective, 20:8825 (R;US)
Marder, A.R., *See* Levin, B.F., 20:8078
Marelly, M., *See* Ben-Haim, M., 20:8229
Marforio, K., *See* Lassesson, B., 20:8059
Maribo Pedersen, B., Lightning protection of wind turbine generator systems and EMC problems in the associated control systems, 20:7611 (R;DK)
Marinova, K.P., *See* Anastasov, A., 20:8863
Markel, V.A., Optical properties of fractal nanocomposites, 20:8980 (R;US)
Markiewicz, M., *See* Hofmann, P., 20:9108
Markiewicz, T.W., A test of the flavor independence of strong interactions, 20:8817 (R;US)
Markkilde Petersen, S., Wind turbine test Nordtank NTK 500/37. System test, 20:7623 (R;DK)
Markov, B.N., *See* Anastasov, A., 20:8863
Maroti, L., *See* Gyenes, G., 20:7734
Marschman, S.C., *See* Makenas, B.J., 20:7372
Marsden, J.E., *See* Alder, M.S., 20:9178
Marsh, S.F., Distributions of 15 elements on 58 absorbers from simulated Hanford Double-Shell Slurry Feed (DSSF), 20:7478 (R;US)
See Svitra, Z.V., 20:7323
Marsh, T.L., *See* Ulibarri, C.A., 20:7251
Martenak, T., *See* Hoskin, D., 20:7955
Martin Campo, C. del, *See* Francois, J.L., 20:7645
Martin, J.D., *See* Bussell, J.H., 20:7396
Martin-Landrove, M., *See* Gonzalez, J.A., 20:8697
Martinez, B., *See* Gomez, P., 20:8474
Martinez, J.L., *See* Nyhan, J.W., 20:8238
Martinez-Lugo, R., Determination of U-235 enrichment on uranium materials by gamma spectrometry., 20:8162 (IA;MX)
Martinez-Pardo, M.E., Effects of chain orientation on the radiation response of atactic polystyrene., 20:8209 (IA;MX)
Martino, A., Synthesis and characterization of FE colloid catalysts in inverse micelle solutions, 20:8194 (R;US)
Martoglio, P.A., *See* Reffner, J.A., 20:8981
Maschek, W., *See* Struwe, D., 20:7792
Mashiatullah, A., Coliform bacteria as in indicator of sewerage water mixing with drinking water sources in Rawalpindi city, 20:8545 (R;PK)
Maslov, N.I., Photonuclear transmutation alloying of silicon monocrystals with aluminium, 20:9007 (IA;RU;In Russian)
Maslov, O.D., Application of microtron braking gamma radiation to study heavy metal distribution in the process of coal burning, 20:8167 (IA;RU;In Russian)
Mason, M.J., *See* Felmy, A.R., 20:7348, 20:8192
Mast, J.C., Operability test procedure [Tank] 241-SY-101 equipment removal system, 20:7405 (R;US)
Masuda, Hiroaki, A search for jet handedness in hadronic Z^0 decays, 20:8813 (R;US)
Matejka, K., Instruction texts and problems for the training and examination of selected personnel at research nuclear facilities, 20:9135 (I;CZ;In Czech)

Vol. 1: Selected chapters in reactor theory, 20:7689 (I;CZ;In Czech)
Vol. 2: Experimental education methods, 20:9136 (I;CZ;In Czech)
Vol. 3: Research and experimental reactors, 20:7768 (I;CZ;In Czech)
Vol. 4: Technical descriptions of Czechoslovak research reactors. Part 1. Technical description of the LVR-15 reactor, 20:7769 (I;CZ;In Czech)
Vol. 4: Technical descriptions of Czechoslovak research reactors. Part 3. Technical description of the VR-1 reactor, 20:7770 (I;CZ;In Czech)
Matheson, J.D., *See* Tingey, J.M., 20:7345
Matheson, S., *See* Goodman, P., 20:8990
Mathewson, A.G., Vacuum system design, 20:8334 (IA;XC)
Mathieu, B., Release of dinitrous oxide from intertidal sediments - illustrated by the example of the Elbe estuary (Muehlenberger Loch) and coastal tidal region (Koenigshafen/Sylt), 20:8447 (R;DE;In German)
Mathieu, F., *See* Renard, C., 20:7280
Mathieu, P., Operational safety in plutonium processing workshops at the La Hague site, 20:7275 (RA;XA)
Matmor, A., *See* Ankry, N., 20:8351
Matos, J.E., *See* Bretscher, M.M., 20:7763
Matson, D.W., New nanophase iron-based catalysts for hydrocracking applications, 20:7231 (R;US)
Matsuda, M., *See* Ignatiev, A.Yu., 20:8822
Matter, D., *See* Burtscher, H., 20:8477
Matter, L., *See* Schreiber, G.A., 20:8600
Mattson, J.E., Epitaxial growth of bcc transition metal films and superlattices onto MgO (111), (011) and (001) substrates, 20:8071 (R;US)
Matyushin, A.T., *See* Aksinenko, V.D., 20:8387
Matyushin, V.T., *See* Aksinenko, V.D., 20:8387
Mauch, U., Internalisation of external costs in Switzerland and Europe, 20:7843 (IA;CH)
Mauck, J.L., Computer software review procedures, 20:7738 (RA;XA)
Mavliev, R., On the detection efficiency of ultrafine CNC at 1-3 nm size range, 20:8446 (RA;FI)
Mayo, D.R., *See* Nelson, R.O., 20:8937
Mayorshin, A.A., *See* Skiba, O.V., 20:7676
Mazor, T., Simulator for the A-SMG 90, 20:8355 (RA;IL)
The Radiation Monitor (RAM-R) system, 20:8354 (RA;IL)
See Ankry, N., 20:8353
See Ellenbogen, M., 20:8356
Mazumder, M.K., Electrostatic beneficiation of coal. Quarterly technical progress report, July 1, 1994–September 30, 1994, 20:7099 (R;US)
McCabe, D.J., Cesium cobaltdicarbollide-solubility, precipitation, and reactivity in basic aqueous solution, 20:7433 (R;US)
McCabe, G.H., *See* Vick, J.D., 20:7864
McClintock, B., *See* Hoskin, D., 20:7955
McClusky, J.K., *See* Knutson, D.E., 20:7487
McCormick, C., Responsive copolymers for enhanced petroleum recovery. Quarterly technical progress report, June 23–September 21, 1994, 20:8180 (R;US)
McCoy, R.M., Load test of the 277W Building high bay roof deck and support structure, 20:7494 (R;US)
McCulloch, D.G., Structural investigation of xenon ion-beam-irradiated glassy carbon, 20:9015 (R;AU)
McDaniel, P.A., *See* Dechert, T.V., 20:7311
McDonald, J.C., Intercomparison of high energy neutron personnel dosimeters, 20:8395 (R;US)
McDonald, R.J., *See* Kweller, E., 20:7947
McDonald, W.J., Horizontal oil well applications and oil recovery assessment. Technical progress report-final, July 1994–September 1994, 20:7204 (R;US)
McDowell, M.W., *See* Li, Y., 20:8332
McElroy, L., *See* Bookless, W.A., 20:9129
McGarry, A.T., *See* Madden, J.S., 20:8465
McGrath, R.D., AURA™: A fiberglass based vacuum insulation panel technology, 20:7993 (RA;US)
McHale, J.M. Jr., Solution based synthesis of perovskite-type oxide films and powders, 20:8127 (R;US)
McHerron, D., *See* Martinez-Pardo, M.E., 20:8209
Mcinerney, M.J., *See* Zhang, X., 20:7199
McInnis, S.H., Cadmium Control and Safety Rod Disposal at the Savannah River Site, 20:7426 (R;US)
McKay, M.D., *See* Helton, J.C., 20:7821
McKellar, B.H.J., *See* Costella, J.P., 20:8751
See Ma, J.P., 20:8747
McKenna, P.J., Acceptance test procedure for the MO-294 Building, 20:7373 (R;US)
McKenzie, A.R., *See* Laaksonen, A., 20:8443
McKinley, S.G., *See* Pool, K.N., 20:7398
See Tingey, J.M., 20:7345
McLaughlin, D.F., Evaluation of plasma melter technology for verification of high-sodium content low-level radioactive liquid wastes: Demonstration test No. 4 preliminary test report, 20:7422 (R;US)
McMahon, J., *See* Turiel, I., 20:7982
McMullin, S.R., Evaluation of the effectiveness of the sealed double-ringed infiltrometers and the effects of changes in atmospheric pressure on hydraulic conductivity, 20:7438 (R;US)
McNamara, W.F., *See* Saunders, R.S., 20:8148
McPherson, D.W., *See* Knapp, F.F. Jr., 20:8218
McRae, D., High explosive spot test analyses of samples from Operable Unit (OU) 1111, 20:8497 (R;US)
See Haywood, W., 20:8420
McShurley, D., *See* Aston, D., 20:8401
McWethy, L.M., Tank SY-101 void fraction instrument functional design criteria, 20:7403 (R;US)
Meas, Y., *See* Becerril, A., 20:8215
Mehlhorn, T.A., *See* Filuk, A.B., 20:9126
Mehos, M., Overview of solar detoxification activities in the United States, 20:8463 (R;US)
Meier, D.L., *See* Doshi, P., 20:7595
Meisner, J.E., *See* Stromswold, D.C., 20:8409
Melaaen, E., Dynamic simulation of the liquefaction section in baseload LNG plants, 20:8254 (R;NO)
Melamud, M., *See* Kuznietz, M., 20:8081, 20:8082, 20:8121, 20:8122, 20:8983
Melkumov, G.L., *See* Abraamyan, Kh.U., 20:8936
Melzer, H., *See* Hagen, G., 20:7162
Menegat, L., *See* Wang, J.W., 20:8328
Mensah, S.Y., Acoustomagnetoelectric effect in a superlattice, 20:8696 (R;XA)
Mensinger, E., *See* Huber, R., 20:7802
Mercier, J.P., Safety principles for plutonium facilities in France, 20:7786 (RA;XA)
Merkle, K.L., *See* Rozeveld, S., 20:9026
Merrill, R.A., Vitrification of high sulfate wastes, 20:7350 (R;US)
Merritt, P.A., *See* Dodd, B., 20:7765
Mertens, E.P., Virtual reality and stereoscopic telepresence, 20:7491 (R;US)
Meshcheryakov, G.V., *See* Meshcheryakov, V.A., 20:8802
Meshcheryakov, V.A., On Explanation of Proton Electromagnetic Form Factor Near p anti p-Threshold from the PS-170 Experiment, 20:8802 (R;XJ;In Russian)
See Krupa, D., 20:8836
Metcalf, D., *See* Duran, G., 20:7583
Metschies, M., *See* Schreiber, G.A., 20:8600
Metzger, H., *See* Leistikow, S., 20:7813
Meyer, A., CFC- and FHC-free refrigerators by FORON Hausgeraete Co. - a breakthrough in household refrigeration, 20:8002 (RA;US)
Energy research - as seen by industry, 20:7841 (IA;CH)
Meyer, D., *See* Benz, G., 20:7816
Meyer, L., *See* Huber, R., 20:7802
See Jacobs, H., 20:7795
Meyne, J., Molecular architecture of classical cytological landmarks: Centromeres and telomeres, 20:8584 (R;US)
Mi, *See* Schreiber, G.A., 20:8600
Michalakes, J.G., Computational load in model physics of the parallel NCAR community climate model, 20:8430 (R;US)
Michalski, G.W., *See* Cunningham, R.E., 20:7242
Middleton, C., *See* Bookless, W.A., 20:9129
Mielke, M.F., *See* Herrmann, G.H., 20:7991
Mihevc, T., *See* Lyles, B., 20:8473
Mihevc, T.M., *See* Chapman, J.B., 20:8472
Mikhailov, M.N., *See* Gorelov, A.I., 20:7727

Mikhajlov, I.N., Nature of Negative Parity of Collective Modes, 20:8864 (R;XJ;In Russian)
Mikhin, V.I., Numerical analysis of nonstationary temperature fields in central zones of nuclear reactor fuel assemblies, 20:7701 (R;RU;In Russian)
Mikkanen, M., *See* Jaervinen, J., 20:7632
Mikkanen, P., Aerosols in black liquor combustion, 20:7559 (RA;FI)
See Haemeri, K., 20:8437
See Sinquefield, S.A., 20:7545
Mikkonen, R., *See* Maekinen, H., 20:7827
Miley, H.S., *See* Barabash, A.S., 20:8870
Millar, J.S., Estimation and characterization of decontamination and decommissioning solid waste expected from the Plutonium Finishing Plant, 20:7368 (R;US)
Miller, D.J., Rate inhibition of steam gasification by adsorbed hydrogen. Quarterly technical progress report, July 1–September 30, 1994, 20:7568 (R;US)
See Todt, V.R., 20:8118
Miller, D.W., *See* Ha Jaejoo, 20:7728
Miller, J.D., *See* Jensen, G.F., 20:7146
Miller, J.H., *See* Fuciarelli, A.F., 20:8632
Miller, J.P., *See* Hamann, N., 20:8819
Miller, M., *See* Albright, W., 20:7443
Miller, N., *See* Kim, J., 20:8653
Miller, P.R., *See* Josefsson, T.W., 20:9018
See Rossouw, C.J., 20:9013
Miller, R.F., *See* Pechersky, M.J., 20:7697
Millet, A.J., *See* Adkisson, B.P., 20:9149
Min, B.M., *See* Choi, I.S., 20:7971
See Lee, H.K., 20:7970
See Son, J.I., 20:8457
See Son, Y.M., 20:8456
Min, Byeong Joo, *See* Seok, Ho Cheon, 20:7673
Min, Byung Joo, Development of nuclear theory model for measuring and evaluating basic nuclear data, 20:9191 (R;KR;In Korean)
Min, J.H., *See* Hong, S.H., 20:7964
Min, Kyeong Ho, *See* Chung, Moon Ki, 20:7686
Minea, R., *See* Catana, D., 20:8319, 20:8320
Miner, A.N., Hazards assessment document for receiving basin for offsite fuel (244-H) and resin regeneration facility (245-H) (RBOF/RRF), 20:8637 (R;US)
Mines, G.L., Field investigations examining the impact of supersaturated vapor expansions on turbine performance, 20:7608 (R;US)
Minkov, B., *See* Moses, W.W., 20:8392
Minsker, J.H., *See* Abbott, J.G., 20:7987
Mireshghi, Ali, *See* Hong, Wan-Shick, 20:8393
Mironenko, M.V., The cascade of reservoirs of the "Mayak" Plant: Case history and the first version of a computer simulator, 20:7479 (R;US)
Mironenko, V.A., Development of analytical and numerical models for the assessment and interpretation of hydrogeological field tests, 20:7326 (R;US)
See Rumynin, V.G., 20:8499
Mirzabeygui, Jahanshah, Abstracts of annual physics conference of Iran 1373, Kordestan University, Sanandaj, 19 Aug - 1 Sep 1994, 20:8655 (I;IR;In English, Persian)
Mirzadeh, S., *See* Knapp, F.F. Jr., 20:8218
Missenden, J.F., *See* James, R.W., 20:8006
Mitchell, G., Surface properties of photo-oxidized bituminous coals. Technical progress report, July–September, 1994, 20:7148 (R;US)
Mitchell, K.L., *See* Frank, M.R., 20:8826
Mitchell, K.W., *See* King, R.R., 20:7594
Mitchell, R.E., *See* Diaz, R., 20:7176
Mitchell, R.L., *See* Witt, C.E., 20:7596
Mitchell, R.T., *See* Shen, D.S., 20:8279
Miyahara, A., The possibilities for a staged approach in the development of intense neutron sources, 20:7532 (IA;DE)
Miyoshi, D.S., An overview of technology, equipment and applications, 20:7511 (R;US)
Mo, S.C., *See* Bretscher, M.M., 20:7763
Mobilia, R.L., *See* Gousheh, S.S., 20:8761
Mobrand, L.E., *See* Lestelle, L.C., 20:8523
Modena, S.A., Just-in-time information forwarding: Biological systems viewed as Shannonian Communication Systems, 20:8562 (RA;US)
Modestino, A.J., *See* Diaz, A.F., 20:7248
Moeddritsch, W., *See* Golshani, A., 20:8834
Moeller, S., Optimized construction and use of flue-gas heat exchangers in the large natural gas fueled boilers, 20:7639 (R;DK;In Danish)
Moeschke, M., *See* Fieg, G., 20:7806
Mojtahedi, W., *See* Wahlroos, H., 20:7106
Molin, S., *See* Frost, C., 20:7887
Molodkin, V.V., *See* Grinchenko, A.Yu., 20:8946
Monroy A, L., Data acquisition system for a deuteration chamber., 20:9052 (I;MX;In Spanish)
Montgomery, J.C., Team interaction skills evaluation criteria for nuclear power plant control room operators, 20:7752 (R;US)
Monti, S., Proposal of an intense 14 MeV neutron source based on μCF, 20:7529 (IA;DE)
Moon, Byung Soo, A study on the application of the fuzzy logic controllers (II), 20:7749 (R;KR;In Korean)
Moon, Jae Sun, *See* Moon, Byung Soo, 20:7749
Moon, KI Hwan, *See* Park, Hyun Soo, 20:7672
See Song, Ki Dong, 20:7860
Moon, R.M. Jr., *See* Roberto, J.B., 20:7876
Moore, J.P., *See* Johnson, G.R., 20:9184
Moore, M., *See* Fox, J., 20:9185
Moos, L.P., Decontamination and dismantlement of the Argonne National Laboratory-East Map Tube Facility, 20:7468 (R;US)
Moreh, R., *See* Kahane, S., 20:8910
Moreno A, J., Reduction of phenols, detergents and coliform bacteria in samples of waste water by gamma radiation processing., 20:8208 (IA;MX)
See Arzate O, O., 20:8205
Moreno, D., Blister model based on near-surface helium concentration on implanted metals, 20:8085 (RA;IL)
Changes in surface topography of Fcc metals due to helium bombardment, 20:9098 (RA;IL)
$LaNi_5$ in a copper matrix, 20:8084 (RA;IL)
Synergistic effect of helium and hydrogen on copper single crystal, 20:9099 (RA;IL)
See Abramov, E., 20:9100
See Zalkind, S., 20:8086
Moreno, E., *See* Fernandez, M., 20:8156, 20:8315
Morgan, C., *See* Kero, R., 20:9188
Morotti, J., *See* Boysen, J., 20:7240
Morozov, V.A., Odd Proton and Neutron Shells in Light Nuclei, 20:8862 (R;XJ)
Morriseau, B., *See* Sarangapani, S., 20:7932
Moses, W.W., $LuAlO_3$: A high density, high speed scintillator for gamma detection, 20:8392 (R;US)
Moshofsky, R.P., Workflow automation architecture standard, 20:9151 (R;US)
Mosny, J., *See* Gieci, A., 20:7718
Moss, W.E., *See* Veyo, S.E., 20:7937
Motovilov, A.K., Removal of the Energy Dependence from the Resolvent Like Energy Dependent Interactions, 20:8680 (R;XJ)
Mounir, M., *See* Mansour, H.M.M., 20:8955
Mrig, L., *See* Strand, T., 20:7598
Mshelia, E.D., Method of normal coordinates in the formulation of a system with dissipation: The harmonic oscillator, 20:8667 (R;XA)
Muchelemba, J.B., *See* Chiw, P., 20:8009
Muehling, G., *See* Heusener, G., 20:7321
Mueller, A., *See* Bernem, K.H. van, 20:8530
Mueller, C., Insights on radiological risks of US Department of Energy radioactive waste management alternatives in the Environmental Management Programmatic Environmental Impact Statement, 20:7465 (R;US)
Mueller, J.A., B physics with CDF: Recent results and future prospects, 20:8787 (R;US)
Muenchow, L., *See* Blaschke, D., 20:8835
Muenz, H., *See* Schreiber, G.A., 20:8601
Mulik, J., *See* Bourn, G., 20:8064
Muljadi, E., Lightning and the impact on wind turbine generation, 20:7613 (RA;DK)

Muller, D., *See* Aston, D., 20:8401
Muminov, M.M., *See* Bekmirzaev, R.N., 20:8933
Munoz, G.B., Sorption of radioactive Cobalt by sepiolite., 20:8216 (IA;MX)
Murayama, Hitoshi, Supersymmetry, 20:8734 (R;US)
Murillo, G., *See* Fernandez, M., 20:8156, 20:8315
Murphy, D., *See* Schirber, J.E., 20:8147
Murphy, J.E., Magneto-optical transmission-reflection beam splitter for multi-level atoms, 20:8686 (R;AU)
Myers, S.A., The effect of O_2 intercalation on the rotational dynamics and the ordering transition of C_{60}, 20:8175 (R;US)
Myers, W.D., Nuclear Science Division: 1993 Annual report, 20:8844 (R;US)
Mynick, H.E., Transport in gyrokinetic tokamaks, 20:9077 (R;US)
Myong, K.S., *See* Sim, K.S., 20:7535, 20:7569

N

Na, Bong Joo, *See* Jin, Joon Ha, 20:7522, 20:7523
Na, Jeong Won, *See* Chung, Heung Seok, 20:7515, 20:7517
See Park, Hyeon Soo, 20:7320
Na, Jung Won, *See* Sung, Ki Woung, 20:8171
Na, Nan Ju, *See* Ham, Chang Shik, 20:8336
Na, Sang Ho, *See* Yang, Myeong Seung, 20:7668
Na, Won Woo, *See* Hong, Jong Sook, 20:7509
See Park, Hyeon Soo, 20:7510
Na, Yeong Hwan, *See* Seok, Ho Cheon, 20:7673
Naah, E., *See* Ketchemen, B., 20:8484
See Njitchoua, R., 20:8486
Nachev, I., The quantum interference effect in semiconductor space charge layers studied by Feynman path integrals. General formalism and illustrative examples, 20:9040 (R;XA)
Nachev, I.S., A Monte-Carlo model of ionic transport across a solid interface, 20:8698 (R;XA)
Nadooshan, M.N., *See* Zaker, A., 20:8088
Nadzhakov, E.G., *See* Anastasov, A., 20:8863
Naegeli, D., *See* Bourn, G., 20:8064
Nagai, H., *See* Shibata, S., 20:8160
Naim, E., *See* Levinson, S., 20:8362, 20:8364, 20:9190
See Pelled, O., 20:8361
Nakada, M., The necessity for and significance of nuclear fuel recycling in Japan, 20:7270 (RA;XA)
See Sano, H., 20:8157
Nam, Chang Hee, *See* Lee, Jong Min, 20:8232, 20:8293
Nam, Jae Yeol, *See* Lee, Han Young, 20:9199
Nam, Seong Mo, *See* Lee, Jong Min, 20:8169
Nam, Sung Mo, *See* Kim, Chul Jung, 20:8702
See Lee, Jong Min, 20:7516
Namiranian, A., *See* Azakov, S., 20:8701
Nanjundiah, R.S., *See* Michalakes, J.G., 20:8430
Narayanaswami, L., *See* Richards, G.A., 20:8266
Naser, J., IAEA co-ordinated research programme on operator support systems in nuclear power plants, 20:9197 (RA;XA)
Nasution, H., *See* Suripto, A., 20:7762
Natesan, K., Structural alloy with a protective coating containing silicon or silicon-oxide, 20:8104 (PA;US)
Nath, S., Funneling in LANL high intensity linac designs, 20:7325 (R;US)
Nathan, S., *See* Kimmel, G., 20:8155
Natkaniec, I., *See* Smirnov, L.S., 20:9009
Naumov, V.V., *See* Orlov, V.V., 20:7355
Nava M, I., Ion exchange of Cobalt and Cadmium in Zeolite X., 20:8165 (I;MX;In Spanish)
Nazikian, R., *See* Wright, E.L.J., 20:9078
Ndiaye, B., Importance of evaporation processes in the formation of the piezometric depression in Sahelian region: Hypothesis and modelling, 20:8480 (RA;XA;In French)
Neal, J.T., Supai salt karst features: Holbrook Basin, Arizona, 20:7246 (R;US)
Negron Mendoza, A., The influence of ionizing radiation on the formation of polymeric material from aqueous malononitrile., 20:8202 (IA;MX)
Neitzel, H.J., *See* Erbacher, F.J., 20:7809
Nelhiebel, M., *See* Afanas'ev, G.N., 20:8733
Nelin, P., Chernobyl cesium in the Swedish moose population: Effect of age, diet and habitat selection, 20:8508 (R;SE)
Nelson, C.A., CP violation tests for tau/top processes, 20:8714 (R;US)
CP violation tests for top/tau processes, 20:8716 (R;US)
q-bosons and the q-analogue quantized field, 20:8715 (R;US)
Tau as a probe for new physics, 20:8783 (R;US)
Tests for leptonic CP violation in tau decays, 20:8717 (R;US)
Nelson, R.O., Gamma-ray measurements at the WNR white neutron source, 20:8937 (R;US)
Gamma-ray production experiments at the WNR white neutron source, 20:8938 (R;US)
Nelson, W.R., EGS4 in '94: A decade of enhancements, 20:8950 (R;US)
Nemec, V., The mining Pribram in science and technology. Section MC: Mathematical methods in geology, 20:9165 (I;CZ;In Czech)
Nemesure, S., *See* Schwartz, S.E., 20:8431
Neubauer, P., Level 1: Incidental crane operator's and incidental rigger's manual. Revision, 20:7480 (R;US)
Neubert, R.L., *See* Frome, E.L., 20:8644
Neuenschwander, G.G., *See* Schmidt, A.J., 20:7351
Neuffer, D.V., A high-energy high-luminosity $\mu^+ - \mu^-$ collider, 20:8284 (R;US)
Nguyen, D.C., An FEL design code running on Mathcad™, 20:8294 (R;US)
Nguyen, T., *See* Richelle, G., 20:7710
Nho, Ki Man, *See* Yoo, Kun Joong, 20:7665
Nho, Kye Ho, *See* Kim, Uh Chul, 20:8264
Nho, Yeong Chang, *See* Jin, Joon Ha, 20:7523
Nicaise, W.F., *See* Stromswold, D.C., 20:8409
Niccoli, L.G., *See* Knutson, B.J., 20:7371
Nicinski, T., *See* Wei Peng, 20:8690
Nielsen, C., *See* Westborg, S., 20:7553, 20:7554, 20:7555, 20:7556, 20:7557
Nielson, D.L., *See* Lomax, J.D., 20:7216
Niemann, R.C., Design of a high-temperature superconductor current lead for electric utility SMES, 20:7826 (R;US)
Niemer, K.A., Equivalence relations for the 9972-9975 SARP, 20:7285 (R;US)
Niesen, K.A., *See* Vick, J.D., 20:7864
Nieswand, C., *See* Urban, M., 20:9075
Nieves, L.A., *See* Clark, D.E., 20:7848
Nikitenko, Yu.V., A Wide Spectrum Neutron Polarizer for a Pulsed Neutron Source, 20:8380 (R;XJ)
New Development of a Small-Angle Neutron Scattering Instrument for a Pulsed Neutron Source, 20:8379 (R;XJ)
See Dokukin, E.B., 20:8987
Nilsson, Peter, Optimization of biogas recovery by controlled deposition of solid waste. Status report 4, 20:7562 (R;SE;In Swedish)
Nimlos, M.R., Review of research results for the photocatalytic oxidation of hazardous wastes in air, 20:8462 (R;US)
Nimmagadda, M., *See* Faillace, E., 20:7467
Nimmons, J.T., The alliance to commercialize carbonate technology: A revitalized industry commitment to IMHEX® fuel cell commercialization, 20:7940 (RA;US)
Nipkow, J., Swiss Eco Refrigerator Project, 20:7988 (RA;US)
Niyazov, R.A., *See* Usmanov, P.N., 20:8865
Njitchoua, R., Natural groundwater recharge in the Garoua basin (North-Cameroon): Hydrochemical and isotopic approaches, 20:8486 (RA;XA;In French)
No, Jae Man, *See* Sohn, Dong Seong, 20:7704
No, Yeong Chang, *See* Jin, Joon Ha, 20:7522
Noack, V., *See* Hofmann, P., 20:7793, 20:7812
Noda, K., Summary of ESNIT, 20:7525 (IA;DE)
See Billone, M.C., 20:7674
Noh, D.S., Development of an energy efficient industrial gas combustion system, 20:7258 (R;KR;In Korean)
Nomura, Y., Criticality accidents and simplified estimation of total fission number, 20:7276 (RA;XA)
Nootenboom, H., *See* Schreiber, G.A., 20:8601
Norring, K., *See* Hermansson, H.P., 20:8219
North, M.J., *See* VanKuiken, J.C., 20:7904
Norton, J.D., Ammonia in simulated Hanford double-shell tank wastes: Solubility and effects on surface tension, 20:7339 (R;US)

Noter, Y., *See* Ilberg, D., 20:8408
See Lifshitz, Y., 20:8407
Novak, F., *See* Reichmann, F., 20:7446
Novak, J., Methodology of model approaches to ground water reclamation at the Straz deposit, 20:8538 (IA;CZ;In Czech)
Novgorodov, A.F., *See* Yushkevich, Yu.V., 20:8324
Novickas, A.A., *See* VanKuiken, J.C., 20:7904
Novikov, A.G., Choice of cold moderator for the DIN-2PI spectrometer, 20:8346 (R;RU;In Russian)
Novikov, A.P., Crystal defect kritical concentration under crystal-amorphous state transformation of semiconductor materials, 20:8997 (IA;RU;In Russian)
On the temperature dependence of critical dose of silicon crystal-amorphous state transformation under ion implantation, 20:8998 (IA;RU;In Russian)
Novikov, V.V., Basic principles of providing operator information support for power plant control of the VPBER-600 reactor plant, 20:7731 (RA;XA)
Nowlan, M., Automated solar cell assembly teamed process research. Semiannual subcontract report, December 6, 1993–June 30, 1994, 20:7584 (R;US)
Noyes, H.P., Decoherence, determinism and chaos revisited, 20:8682 (R;US)
Nugent, K.W., *See* Gurarie, V.N., 20:8134
See Prawer, S., 20:9014
Nunez, E.F., The lethal effect of gamma irradiation on the meta cestode of Taenia solium in pork., 20:8613 (IA;MX)
Nunez, L., *See* Leonard, R.A., 20:7289
Nurgozhin, N.N., *See* Aksinenko, V.D., 20:8387
Nyhan, J.W., Calibration of neutron moisture gauges and their ability to spatially determine soil water content in environmental studies, 20:8238 (R;US)
Nykaenen, J., Moving granular bed filter research at Delft University of Technology, 20:7141 (RA;FI)
Nyquist, J.E., *See* Doll, W.E., 20:7445
Nystad, A.N., The perspectives of Norwegian petroleum resources, 20:7194 (R;NO)

O

O'Keefe, G., Nuclear techniques in medicine, 20:8594 (R;AU)
O'Meara, D.J. Jr., Gypsy Field project in reservoir characterization. Quarterly progress report, May 19–September 30, 1994, 20:7193 (R;US)
O'Rourke, P.E., Method and apparatus for optical temperature measurement, 20:8412 (PA;US)
See Wicks, G.G., 20:8172
O'Shea, P.G., *See* Nguyen, D.C., 20:8294
O'Shea, T.P., *See* Leo, A.J., 20:7941
Oblad, A.G., *See* Wiser, W.H., 20:7111
Oelgaard, P.L., Improvements in a four factor formula recipe for lattice calculations, 20:7687 (R;DK)
Potential risks of nuclear ships, 20:7784 (R;DK)
Oene, Harmke van, Modelling the impacts of sulphur and nitrogen deposition on forests, 20:8515 (R;SE)
Oeschger, H., Recent findings with respect to climate development, 20:7850 (IA;CH)
Oestergaard Jensen, S., MF-demonstration project at Wewer's Brickyard in Helsinge, 20:7601 (R;DK)
See Kristiansen, F., 20:7603
Oestman, G., Cadmium in Salix. A study to show the capacity of Salix to remove cadmium from farmland, 20:8517 (R;SE;In Swedish)
Oganessian, Yu.Ts., JINR Heavy Ion Program of Low and Medium Energies, 20:8929 (R;XJ)
Synthesis and Properties of Superheavy Nuclei, 20:8930 (R;XJ)
See Belov, A.G., 20:8291
Oganessyan, K.A., *See* Ananikian, N.S., 20:8979
Ogeka, G.J., Laboratory Directed Research and Development Program: Annual report to the Department of Energy, 20:9127 (R;US)
Oguma, R., *See* Bergdahl, B.G., 20:7706
Oh, Byeong Hoon, *See* Hwang, Churl Kew, 20:9068
Oh, Byung Hoon, *See* In, Sang Ryul, 20:9107
See Lee, Kwang Won, 20:9106
Oh, C.S., A study on the energy database establishment, 20:7976 (R;KR;In Korean)
Oh, Deok Joo, *See* Seok, Ho Cheon, 20:7669
Oh, Dong Seok, *See* Lee, Jae Kyung, 20:7659
Oh, In Seok, *See* Sim, Bong Shick, 20:7750
Oh, J.M., *See* Jeon, H.S., 20:7966
Oh, Jong Myung, *See* Hong, Jun Hwa, 20:8099, 20:8263
See Lee, Jae Kyung, 20:7659
Oh, Joung Hun, *See* Lee, Ji Ho, 20:9192
Oh, Keun Bae, A study on the establishment of national nuclear foreign policy -with reference to the strategy on the NPT extension and analysis of nuclear liability-, 20:9141 (R;KR;In Korean)
See Choi, Young Myung, 20:9143, 20:9146
Oh, Sei Ki, *See* Kim, Yong, 20:9139
Oh, Seok Jin, *See* Kang, Thae Kap, 20:8125
Oh, Soo Yeol, *See* Sohn, Dong Seong, 20:7704
Oh, Yong Jun, *See* Hong, Jun Hwa, 20:8099
Ohene, F., Effect of coal beneficiation process on rheology/atomization of coal water slurries. Quarterly progress report, August 1–October 31, 1994, 20:7143 (R;US)
Ohlrogge, K., Off-gas purification by means of membrane vapor separation systems, 20:7244 (R;DE)
Volatile organic compound control technology by means of membranes, 20:8448 (R;DE)
Ohlsson, S., *See* Hamann, N., 20:8819
Ohnishi, Yukiyoshi, Measurement of α_s from hadronic event observables at the Z^0 resonance, 20:8809 (R;US)
Ohtsuki, Kazumasa, *See* Yamazaki, Toshimitsu, 20:8970
Okabayashi, M., *See* Talvard, M., 20:9083
Okuno, H., *See* Nomura, Y., 20:7276
Olbright, G.R., *See* Bryan, R.P., 20:8272
Oleinick, N.L., *See* Casarett, G.W., 20:8627
Oleksuk, L.L.S., *See* Curtin, W.A., 20:8143
Oliver, W.C., *See* Lucas, B.N., 20:8076
Olsen, D., *See* Sarathi, P., 20:7227
Olsen, P.C., *See* Rieksts, G.A., 20:8633
Olsson, Olle, The structure of conceptual models with application to the Aespoe HRL project, 20:7359 (R;SE)
Omberg, R.P., *See* Makenas, B.J., 20:7372
Ono, M., Formation of core transport barrier and CH-Mode by ion Bernstein wave heating in PBX-M, 20:9086 (R;US)
See Ignat, D.W., 20:9080
Opat, G., *See* Feng, Xiaoping, 20:8957
Opat, G.I., Interferometry with particles of non-zero rest mass: topological experiments, 20:8684 (R;AU)
Ordonez-Regil, E., *See* Fernandez-Valverde, S., 20:8201
Oreg, J., *See* Levron, D., 20:8954
Oren, J., *See* Arad, M., 20:7708
Orlov, A.V., *See* Gurarie, V.N., 20:8134
Orlov, V.V., Large-scale future nuclear power and the problem of RAW handling, 20:7355 (IA;CH)
Ortaldo, S.F., *See* Miner, A.N., 20:8637
Orth, R.J., *See* Colton, N.G., 20:7338
See Schmidt, A.J., 20:7351
Osipenko, B.P., *See* Sehrehehtehr, Zh., 20:8383
Osseo-Asare, K., Semiconductor electrochemistry of coal pyrite. Technical progress report, July–September, 1994, 20:7145 (R;US)
Ossorio, P.N., *See* Yesley, M.S., 20:8578
Ostendorf, R.W., Interferometry of hard photons in heavy-ion collisions, 20:8829 (R;FR;In French)
Otake, Y., *See* Suuberg, E.M., 20:7087
Otero, D., *See* Korob, R.O., 20:8158
Ott, D.G., *See* Coburn, M.D., 20:8190, 20:8423
Otten, E.W., *See* Yushkevich, Yu.V., 20:8324
Ouenes, A., *See* Buckley, J.S., 20:7191
Overby, T., *See* Gudbjerg, E., 20:8029
Overcamp, T.J., *See* Cicero, C.A., 20:7429
Ovsyannikov, Y.F., *See* Skiba, O.V., 20:7676
Owolabi, O.O., *See* Watson, R.W., 20:7189, 20:7190
Oxoby, G., *See* Aston, D., 20:8401

P

Pablo, J. de, *See* Grambow, B., 20:8126
Pack, Soong Woo, *See* Sung, Ki Woung, 20:8171
Paek, Seung Uh, *See* Chung, Heung Seok, 20:7517
See Park, Hyeon Soo, 20:7320
Paesler-Sauer, J., *See* Benz, G., 20:7816
Paetsch, L., *See* Bernard, R., 20:7926, 20:7943
Pakala, N., *See* Bhown, A.S., 20:7635
Pakkanen, T., Comparison of denuder systems, a virtual impactor and a Berner low-pressure impactor for determination of nitrate aerosol, 20:8445 (RA;FI)
See Lind, T., 20:7140
Pal'chekh, V.Ch., *See* Tashlykov, I.S., 20:8166
Palacios, L., A BRST charge for non-critical $W_{2,s}$ strings, 20:8724 (R;XA)
Palmer, D.W., *See* Adkins, D.R., 20:8257
Palmer, R., *See* Neuffer, D.V., 20:8284
Palmiter, L., *See* Davis, B., 20:7960
Pals, C.R., Thermal modeling of the lithium/polymer battery, 20:7831 (R;US)
Pan Guoqiang, *See* Luo Chenglin, 20:9028
Pan, Wei-Ping, Co-firing high sulfur coal with refuse derived fuels. Technical progress report No. 1, [September–November 1994], 20:7179 (R;US)
Panaitescu, I., *See* Catana, D., 20:8319
Pandini, L., *See* Garbagnati, E., 20:7616
Pankov, A.A., *See* Babich, A.A., 20:8791
Panvelker, S.V., *See* Duddy, J.E., 20:7110
Papadopoulos, G., The solutions of affine and conformal affine Toda field theory, 20:8739 (R;AU)
Paprockas, K.R., *See* VanKuiken, J.C., 20:7904
Paragamian, V.L., Kokanee stock status and contribution of Cabinet Gorge Hatchery, Lake Pend Oreille, Idaho. Final report, 20:7575 (R;US)
Paran, J., A practical estimation of reliability of Geiger-Mueller tubes, 20:8366 (RA;IL)
Training detector as simulator of alpha detector, 20:8360 (RA;IL)
Parazin, R.E., Caustic addition system operability test procedure, 20:7404 (R;US)
Pardini, A.F., Design criteria for the light duty utility arm system end effectors, 20:7379 (R;US)
Parekh, B.K., Evaluation of hyperbaric filtration for fine coal dewatering. Eighth quarterly technical progress report, July 1, 1994–September 30, 1994, 20:7137 (R;US)
Paretzke, H., *See* Johnson, J.R., 20:8631
Parikh, J., Decision making framework to address climate change, 20:7897 (RA;CH)
Parikh, K., *See* Parikh, J., 20:7897
Park, Byung Ho, *See* Lee, Kwang Won, 20:9106
Park, Byung Ki, *See* Lee, Kwang Won, 20:9106
Park, Chan Eok, *See* Chang, Won Pyo, 20:7664
Park, Chan Won, *See* Chae, Jong Seo, 20:8325
Park, Chang Jae, *See* Rhee, Bo Wook, 20:7683
Park, Chang Jin, *See* Chun, Kwan Sik, 20:7518
Park, Chang Kyu, Development of accident management technology and computer codes -A study for nuclear safety improvement-, 20:9170 (R;KR;In Korean)
Improvement of Level-1 PSA computer code package -A study for nuclear safety improvement-, 20:9171 (R;KR;In Korean)
See Yoo, Keon Joong, 20:7656, 20:7657
Park, Chi Sung, *See* Lee, Sam Lai, 20:7660
Park, Choon Deuk, *See* Kim, Jae Rok, 20:7519
Park, Choon Ho, *See* Choi, Chang Beom, 20:7671
Park, Chun Kyeong, *See* Chung, Moon Ki, 20:7686
See Yoo, Kun Joong, 20:7665
Park, Do Won, *See* Lee, Chang Woo, 20:8619
Park, Doo Won, *See* Lee, Jeong Ho, 20:8618, 20:8622
Park, Duck Gun, *See* Hong, Jun Hwa, 20:8263
Park, Geun Ok, *See* Lee, Jung Woon, 20:9145
Park, H.S., A study on retrofit measures of KIER buildings for energy conservation, 20:7967 (R;KR;In Korean)
Park, Hee Dae, *See* Kim, Chang Kyu, 20:7772
Park, Hee Dea, *See* Kang, Young Ho, 20:8100
Park, Ho Joon, *See* Hong, Jong Sook, 20:7509
See Park, Hyeon Soo, 20:7510
Park, Hong Sik, *See* Kim, Jae Rok, 20:8602
Park, Hyeon Soo, A study on the radioactive waste management for DUPIC fuel cycle - A study on the direct use of spent PWR fuel in CANDU, 20:7320 (R;KR;In Korean)
Technology development for nuclear material safeguards -A study on the direct use of spent PWR fuel in CANDU-, 20:7510 (R;KR;In Korean)
See Yang, Myeong Seung, 20:7668
Park, Hyo Kook, *See* Chun, Kwan Sik, 20:7755
See Kim, Sang Bok, 20:8625
See Lee, Kang Suk, 20:8590
Park, Hyun Soo, DUPIC facility engineering -A study on the direct use of spent PWR fuel in CANDU reactors-, 20:7672 (R;KR;In Korean)
Park, J.S., *See* Sim, K.S., 20:7535
See Son, E.K., 20:7142
Park, Jae Chang, *See* Kwon, Kee Choon, 20:8337
See Lee, Han Young, 20:9199
See Lee, Jung Woon, 20:9145
Park, Jang Jin, *See* Yoon, Myoung Hwan, 20:8170
See Yoon, Myung Hwan, 20:8189
Park, Ji Youn, *See* Kang, Thae Kap, 20:8125
Park, Jin Ho, Development of Long-lived radionuclide handling technology -Development of Long-lived radionuclide transmutation technology-, 20:8621 (R;KR;In Korean)
See Hwang, Sung Tai, 20:7678
See Kim, Tae Ryong, 20:7692, 20:8234
See Sim, Yoon Sub, 20:7663
Park, Jin Seok, *See* Kim, Seung Ho, 20:8230
See Kim, Tae Ryong, 20:8234
Park, Jin Suk, *See* Kim, Tae Ryong, 20:7692
Park, Jong Hwa, *See* Kim, Hee Dong, 20:9172
Park, Jong Hyun, *See* Cheong, Yong Moo, 20:8262
Park, Jong Man, *See* Hong, Jun Hwa, 20:8263
See Kim, Chang Kyu, 20:7772
See Ryu, Woo Seong, 20:7693
Park, Jong Ryunl, *See* Seok, Ho Cheon, 20:7673
Park, Joo Hwan, *See* Cho, Man, 20:7677
See Chung, Jang Hwan, 20:7670
See Seok, Ho Cheon, 20:7669
Park, Joon Won, *See* Chung, Moon Kyu, 20:7655
Park, K.B., *See* Sim, K.S., 20:7535
Park, K.H., Detailed survey of wind energy on Cheju Province for the feasibility study of wind farm(II), 20:7979 (R;KR;In Korean)
See Park, Y.J., 20:8047
Park, Keun Il, *See* Park, Hyeon Soo, 20:7320
Park, Kwang Hyeon, *See* Chung, Chong Eun, 20:8390
Park, Kwang Hyun, A study on the radiation monitoring for the personnel, 20:8617 (R;KR;In Korean)
Park, Kwang Seok, *See* Seok, Ho Cheon, 20:7669
Park, Kyeong Bae, *See* Kim, Jae Rok, 20:8602
Park, Kyung Bae, *See* Kim, Jae Rok, 20:7519
Park, Rae Jun, *See* Park, Chang Kyu, 20:9170
Park, S.C., Process development for energy and compost recovery from biogradable municipal solid waste, 20:7540 (R;KR;In Korean)
See Son, Y.M., 20:8456
Park, S.D., *See* Lee, H.K., 20:7970
See Seo, H.S., 20:7975
See Son, J.I., 20:8457
See Tae, C.S., 20:7974
Park, S.I., A study on the multi-stage combustion in incinerator with low pollution, 20:8267 (R;KR;In Korean)
Park, Sang Joon, *See* Suh, Doo Whan, 20:7771
Park, Se Jin, *See* Ryu, Woo Seong, 20:7693
Park, Seung Deok, *See* Kang, Shin Bok, 20:9167
Park, Seung Kyu, *See* Kim, Jeong Moog, 20:8233
Park, Soo Jin, *See* Kang, Shin Bok, 20:9167
See Kang, Sin Bok, 20:9144
Park, Soon Cheol, *See* Jin, Joon Ha, 20:7522, 20:7523
Park, Soon Dong, *See* Hong, Gyee Won, 20:9038
Park, Soon Yong, *See* Kim, Seung Ho, 20:8236

See Lee, Jong Min, 20:8235
Park, W.S., *See* Lee, C.H., 20:7978
Park, Won Man, *See* Kwon, Kee Choon, 20:8337
Park, Woong Woo, *See* Kim, Jae Rok, 20:7519
Park, Y.J., A study on resources survey and characteristic of wastes in Korea(II), 20:8047 (R;KR;In Korean)
See Hofmayer, C.H., 20:7781
See Kim, B.H., 20:7965
See Park, S.I., 20:8267
Park, Yeon Sik, *See* Kang, Shin Bok, 20:9167
Park, Yun Sik, *See* Choi, Young Myung, 20:9146
Parker, R.J., *See* Berger, D.J., 20:7125, 20:7127
Parker, S.E., *See* Mynick, H.E., 20:9077
Parkman, H., Phthalates in Swedish sediments, 20:8541 (R;SE)
Parrell, J.A., Cooling rate effects on the microstructure, critical current density, and $T_c$transition of one- and two-powder BSCCO-2223 Ag-sheathed tapes, 20:8115 (R;US)
Pasler, H., *See* Dillmann, H.G., 20:7808
Passard, C., Application of active neutronic interrogation method to the line analysis in reprocessing plant, 20:7264 (R;FR;In French)
Passman, F.J., Catalase as an indicator of microbial contamination in fuel oil, 20:7954 (RA;US)
Patel, P., MCFC development for logistic fuel applications, 20:7936 (RA;US)
See Bernard, R., 20:7943
Paterson, D., *See* Goodman, P., 20:8990
Patzig, S., *See* Bernem, K.H. van, 20:8530
Paul, B., *See* Chugh, Y.P., 20:7153
Paul, D.M., *See* Tomy, C.V., 20:8982
Paul, J., Water as refrigerant and secondary refrigerant: Technologies for the production of chilled water and ice-slurries, 20:7999 (RA;US)
Paul, P.H., Correlations for the NO $A^2\Sigma^+$ electronic quenching cross-section, 20:8963 (R;US)
Paul, W., *See* Blatter, J., 20:9032
Paunesku, T., Use of labeled primers for differential display, 20:8572 (R;US)
Paver, N., *See* Babich, A.A., 20:8791
Paxson, V., Wide-area traffic: The failure of Poisson modeling, 20:9180 (R;US)
Payne, J.L., Verification of computational aerodynamic predictions for complex hypersonic vehicles using the INCA™ code, 20:8258 (R;US)
See Wong, C.C., 20:8255, 20:8256
Pearce, K.L., *See* Stokes, T.I., 20:7418
Pechersky, M.J., Residual Stress Measurements with Laser Speckle Correlation Interferometry and Local Heat Treating, 20:7697 (R;US)
Pedersen, Aa.E., Lightning flashes to non-conductive (fibre glass) rotor blades of wind turbines, 20:7615 (RA;DK)
Pedersen, K., Shaft furnace gasification with regard to cogeneration. Partial report no. 1: Catalytic cracking of tar in synthesis gas. Bench-scale tests with hydro cracking catalysts, 20:7548 (R;DK;In Danish)
Pederson, L., *See* Stevenson, J., 20:7920
Pederson, L.R., *See* Norton, J.D., 20:7339
Pedraza, C.L., *See* Nunez, E.F., 20:8613
Pek, A.A., Modeling of the fault-controlled hydrothermal ore-forming systems, 20:7328 (R;US)
See Malkovsky, V.I., 20:7327
Peletminsky, S.V., *See* Kovalevsky, M.Yu., 20:9023
Pelled, O., Detection limits for differential measuring methods for natural uranium, 20:8361 (RA;IL)
See Levinson, S., 20:8362
Pelusi, J., *See* Boucau, J., 20:7719
Pember, R.B., A higher-order projection method for the simulation of unsteady turbulent nonpremixed combustion in an industrial burner, 20:8220 (R;US)
Peng Xiufeng, Progress on the evaluation of charged particle nuclear reaction data in Sichuan University, 20:8905 (RA;CN)
Peng, F.F., Hydrocarbon-oil encapsulate bubble flotation of fine coal. Technical progress report for the seventh quarter, April 1, 1992–June 30, 1992, 20:7090 (R;US)
Hydrocarbon-oil encapsulate bubble flotation of fine coal. Technical progress report for the eighth quarter, July 1, 1992–September 30, 1992, 20:7091 (R;US)
Hydrocarbon-oil encapsulated air bubble flotation of fine coal. 1st Quarterly report, October 1, 1990–December 31, 1990, 20:7088 (R;US)
Hydrocarbon-oil encapsulated air bubble flotation of fine coal. Technical progress report for the second quarter, January 1, 1991–March 31, 1991, 20:7093 (R;US)
Hydrocarbon-oil encapsulated air bubble flotation of fine coal. Technical progress report for the third quarter, April 1, 1991–June 30, 1991, 20:7094 (R;US)
Hydrocarbon-oil encapsulated air bubble flotation of fine coal. Technical progress report for the fifth quarter, October 1, 1991–December 30, 1991, 20:7166 (R;US)
Hydrocarbon-oil encapsulated bubble flotation of fine coal. Technical progress report for the sixth quarter, January 1, 1992–March 30, 1992, 20:7089 (R;US)
Hydrocarbon-oil encapsulated bubble flotation of fine coal. Technical progress report for the ninth quarter, October 1, 1992–December 31, 1992, 20:7092 (R;US)
Hydrocarbon-oil encapsulated bubble flotation of fine coal. Technical progress report for the fourth quarter, July 1, 1991–September 30, 1991, 20:7095 (R;US)
Penionzhkevich, Yu.E., *See* Oganessian, Yu.Ts., 20:8929
Penney, T., Developing a standardized test procedure for hybrid vehicles: The challenge of the SAE HEV task force, 20:8062 (R;US)
Peppler, W., *See* Huber, F., 20:7800
Pereverzeva, S.A., *See* Rumynin, V.G., 20:8499
Perez, S., *See* Ayazuddin, S.K., 20:7775
Perez-Mendez, V., *See* Hong, Wan-Shick, 20:8393
Perkins, C., *See* Foerster, C.L., 20:8333
Perl, M.L., Tau physics at future facilities, 20:8840 (R;US)
The discovery of the tau lepton: Part 1, The early history through 1975; Part 2, Confirmation of the discovery and measurement of major properties, 1976–1982, 20:8839 (R;US)
Pernick, A., Applications of collimated airborne monitoring in radiological emergency response, 20:8450 (RA;IL)
Perona, J.J., *See* Coroneos, A.C., 20:7335
Persoff, P., Progress on flow visualization and relative permeability measurement in transparent replicas of natural fractures from Yucca Mountain, 20:7330 (R;US)
Person, J.C., Grout gas generation test plan, 20:7416 (R;US)
Persson, Gunnar, Eutrophication of soil, fresh water and the sea, 20:8516 (R;SE)
Pervushin, V.N., *See* Blaschke, D., 20:8835
Pestova, G.D., *See* Glagolev, V.V., 20:8934
Peterelt, E., *See* Hill, N.F., 20:8341
Peters, C., *See* Lee, E., 20:9123
Peters, R.D., *See* Merrill, R.A., 20:7350
Peters, W.A., *See* Diaz, A.F., 20:7248
Petersen, L.P., *See* Persoff, P., 20:7330
Peterson, J.E., *See* Majer, E.L., 20:8428
Peterson, J.E. Jr., *See* Romero, A.E. Jr., 20:7605
Peterson, Kjell, *See* Cooper, D., 20:8455
Peterson, T.S., *See* Vick, J.D., 20:7864
Peterson, T.W., *See* Helble, J.J., 20:7175
Petraglia, V.J., *See* Laurens, R.M., 20:7939
Petrenko, A.V., *See* Dokukin, E.B., 20:8987
Petrova, A.G., Modification of silicon near surface layer under nitrogen ion implantation, 20:9003 (IA;RU;In Russian)
Pettersen, J., A CO_2 vapour compression system for vehicle air conditioning, 20:8015 (RA;US)
Petty, K.H., *See* Luce, T.C., 20:9048
Peuzner, P.A., Towards DNA sequencing by hybridization, 20:8563 (RA;US)
Peyrovan, H., Characterization of superconducting thin films by rutherford backscattering analysis, 20:8985 (IA;IR;In English, Persian)
Pezeshki, S., Iran's petroleum policy: Current trends and the future outlook, 20:7237 (R;US)
Pfullmann, T., Local quantitative phase analysis of two-phase TiAl(Cr)-alloys by analytical transmission electron microscopy, 20:8080 (R;DE;In German)

Pfund, D.M., *See* Fulton, J.L., 20:8191
Pham, H.T., *See* Decaire, B.R., 20:8034
Philipp, B.L., *See* Reich, F.R., 20:7370
Phillips, J.D., *See* Felise, P., 20:7390
Phillips, N.M., Pollution prevention opportunity assessment for Building 922 solid office waste, 20:7356 (R;US)
See Braye, S., 20:7357
Phillpot, S.R., *See* Wang, J., 20:8971
Philp, R.P., Organosulphur compounds in coals as determined by reaction with Raney nickel and microscale pyrolysis techniques. First quarterly report, July 1, 1994–September 30, 1994, 20:7149 (R;US)
Pianka, E.W., Soil weight (lbf/ft^3) at Hanford waste storage locations (2 volumes), 20:7409 (R;US)
Pickett, J.B., *See* Poulos, D.G., 20:7440
Pickett, W.W., *See* Brevick, C.H., 20:7400, 20:7401
Pickrell, J., *See* Lee, E., 20:9123
Pieper, S.C., *See* Gropp, W., 20:9154
Piestun, S., *See* Levinson, S., 20:8363
See Wengrowicz, U., 20:8359
Pigeaud, A., Trace species removal for fuel cell application, 20:7931 (RA;US)
Pigini, A., *See* Celi, O., 20:7625
See Garbagnati, E., 20:7618
Pillet, G., Betting on climate states. The impact of climate change prospects on decision making under "strong" uncertainty and collective risks, 20:7900 (RA;CH)
Steps towards a decision making framework to address climate change, 20:7890 (R;CH)
Pinto, H., *See* Kuznietz, M., 20:8081, 20:8082, 20:8121, 20:8122, 20:8983
Pisent, G., *See* Dortmans, P.J., 20:8745
Piskarev, I.M., *See* Alimov, A.S., 20:8921
Pitirimova, N.A., Structural transformations in SnO_2 films bombarded by Kr^+ ions, 20:9008 (IA;RU;In Russian)
Pitts, K.T., Electroweak coupling measurements from polarized Bhabha scattering at the Z^0 resonance, 20:8812 (R;US)
Pitts, M.J., Detailed evaluation of the West Kiehl alkaline-surfactant-polymer field project and it's application to mature Minnelusa waterfloods. Technical progress report, July–September, 1994, 20:7203 (R;US)
Piwetz, M., *See* Patel, P., 20:7936
Piwetz, M.M., *See* Veyo, S.E., 20:7937
Plotnikov, G.L., *See* Ehmeksuzyan, V.M., 20:8094
Plut, T.A., *See* Zolper, J.C., 20:7593
Pobanz, B.M., *See* Baskett, R.L., 20:8645
Pobedonostsev, A.B., *See* Novikov, V.V., 20:7731
Poe, T.P., Significance of selective predation and development of prey protection measures for juvenile salmonids in the Columbia and Snake River Reservoirs. Annual report, February 1992–February 1993, 20:7577 (R;US)
Pohlmann, K., Identification of potential groundwater flow paths using geological and geophysical data, 20:8650 (R;US)
Pokotilovski, Yu.N., Production and Storage of Ultracold Neutrons at Pulse Neutron Sources with Low Repetition Rates, 20:7521 (R;XJ)
Polak, E., *See* Baran, A., 20:8588
Poleshchenko, K.N., Ion beam modification of hard alloy surfaces, 20:8123 (IA;RU;In Russian)
Polevoj, V.B., *See* Leont'ev, V.V., 20:7688
Policroniades, R., *See* Fernandez, M., 20:8156, 20:8315
Polizzi, L.M., *See* Ades, M.J., 20:7427
Pollard, D.D., Models of natural fracture connectivity – Implications for reservoir permeability. Final report, 20:8649 (R;US)
Polyakov, V.B., *See* Mironenko, M.V., 20:7479
Pond, R.B., *See* Bretscher, M.M., 20:7763
Pool, K.H., *See* Tingey, J.M., 20:7345
Pool, K.N., Single Shell Tank Waste Characterization Project for Tank B-110, Core 9 - data package and PNL validation summary report, 20:7398 (R;US)
Porodnov, P.T., *See* Skiba, O.V., 20:7676
Poroshin, N.O., *See* Ivanov, V.V., 20:9166
Poshusta, J.C., *See* Schmidt, A.J., 20:7351
Posillico, T., Design study for advanced flame quality indicator, 20:7956 (RA;US)
Posmourny, K., *See* Domas, J., 20:8494
Postoev, V.E., *See* Golovin, V.M., 20:8368
Potempa, A., *See* Veselov, G.V., 20:8382
Potempa, Y., *See* Veselov, G.V., 20:8382
Pottmeyer, J.A., *See* Millar, J.S., 20:7368
Poulos, D.G., Upfront Delisting of F006 Mixed Waste, 20:7440 (R;US)
Poulos, S., *See* Penney, T., 20:8062
Povorznyuk, S.N., *See* Poleshchenko, K.N., 20:8123
Powell, J., *See* Haywood, W., 20:8420
See McRae, D., 20:8497
Pozdniakov, S.P., *See* Mironenko, V.A., 20:7326
Pozzoli, R., *See* Davydenko, V.I., 20:9042
Pradhan, V.R., *See* Comolli, A.G., 20:7134
Prager, S.C., Advances and prospects in reversed field pinch research, 20:9045 (R;US)
See Sovinec, C.R., 20:9046
Prather, W.S., *See* O'Rourke, P.E., 20:8412
Pratt, W.T., *See* Whitehead, D.W., 20:7650
Prawer, S., Polarized Raman spectroscopy of chemically vapour deposited diamond films, 20:9014 (R;AU)
See Gurarie, V.N., 20:8134
See McCulloch, D.G., 20:9015
Preecs, B.L., Information systems of the future: Rights and responsibilities, 20:9196 (R;US)
Prescott, C.Y., Review of the SLAC and Les Houches workshops, 20:8330 (R;US)
Price, M.E., *See* Bailey, K.C., 20:8068
Pride, J.D., *See* Diaz, A.F., 20:7248
Prilepo, V.L., Changes ib structure and properties of amorphous metallic alloys under ion irradiation, 20:8090 (IA;RU;In Russian)
See Urmanov, A.R., 20:8999
Prochazka, J., *See* Manour, J., 20:7449
Proshin, V.A., *See* Golovanev, V.E., 20:7733
See Gorelov, A.I., 20:7727
Pruess, K., *See* Persoff, P., 20:7330
Pruner, R.E. II, *See* Haschke, J.M., 20:8421
Purehvdorzh, B., *See* Ivanov, V.V., 20:9166
Puzynin, I.V., *See* Ivanov, V.V., 20:9166
Pyyny, J., *See* Qian Mingsen, 20:7580, 20:7581

Q

Qaim, S.M., Progress report on nuclear data research in the Federal Republic of Germany for the period April 1, 1993 to March 31, 1994, 20:9138 (R;DE)
Qazi, M.K., Development of a new control software package for Pakistan Research Reactor-2, 20:7751 (R;PK)
Environmental impact of Pakistan Research Reactor-2 following a hypothetical radiological release accident, 20:7759 (R;PK)
Qi Huiquan, Optical model parameters and fast neutron small angles scattering cross sections, 20:8898 (RA;CN)
The evaluation of cobalt data for 10^{-5} eV to 20 MeV neutrons, 20:8887 (RA;CN)
Qian Mingsen, Investigation report of dam safety research in China. Report of hydraulic models, 20:7580 (R;FI)
Investigation report of dam safety research in China, 20:7581 (RA;FI)
Qian, J., Fusion energy and intense neutron sources in China, 20:9118 (IA;DE)
Qian, Y.L, A new target concept for production of slow positrons, 20:8261 (R;US)
Qian, Y.Z., *See* Bruggen, M., 20:8688
Qiu Zhihong, *See* Wang Yansen, 20:8899
Qiu, Xu Z., Proposal for using optical transition radiation for electron beam alignment and emittance measurement for the free emittance measurement for the free electron laser experiments at ATF, 20:8299 (R;US)
Quelroz, M., Particulate behavior in a controlled-profile pulverized coal-fired reactor: A study of coupled turbulent particle dispersion and thermal radiation transport. Quarterly technical progress report, June 15–September 14, 1994, 20:7173 (R;US)

Quisenberry, R.K., *See* Lemon, D.K., 20:7877
Qureshi, R.M., Isotopic and chemical characterization of coal in Pakistan, 20:7161 (R;PK)
See Mashiatullah, A., 20:8545

R

Rabas, T.J., Heat-rate improvements obtained by retubing condensers with new, enhanced tube types, 20:7627 (R;US)
Raczka, R., *See* Dubnicka, S., 20:8792
Rader, D.J., Particle transport in plasma reactors, 20:8149 (R;US)
Radtikerdar, S., Latest information on 1^{94G}d, 20:8858 (IA;IR;In English, Persian)
Radyushkin, A.V., Form Factor of the Process $\gamma^*\gamma^* \rightarrow \pi^0$ for Small Virtuality of One of the Photons and QCD Sum Rules (2): Sum Rule, 20:8764 (R;XJ)
Rafat, M., *See* Benz, G., 20:7816
Rafferty, C.A., Process monitoring using a Quality and Technical Surveillance Program, 20:8077 (R;US)
Raffray, A.R., Progress in tritium retention and release modeling for ceramic breeders, 20:7675 (R;US)
Rai, D., *See* Felmy, A.R., 20:7349
Raitsimring, A., Action of glow discharge on organic solids: primary radiation-chemical processes, formation of radical distribution, radical reactions and application., 20:8203 (IA;MX)
Rakestraw, L.D., Tank vapor mitigation requirements for Hanford Tank Farms, 20:7387 (R;US)
Rakoto, H., *See* Ranaivo Nomenjanahary, F., 20:8489
Rakowsky, G., *See* Stefan, P.M., 20:8312
Ramachandran, R., Spin puzzle in nucleon, 20:8755 (R;XA)
Ramamoorthy, S., *See* Smith, J.D., 20:8311
Ramaswamy, M., Maximum principle for subsolutions of degenerate elliptic operators, 20:8668 (R;XA)
Ramaswamy, S., *See* Ramaswamy, M., 20:8668
Ramirez, E., *See* Arellano, J., 20:7744
See Francois, J.L., 20:7645
Ramirez, M. E., *See* Romero Juarez, M. A., 20:8204
Ramsdell, J.V. Jr., Atmospheric dispersion estimates in the vicinity of buildings, 20:7760 (R;US)
Ramus, J.E., *See* Johnson, G.R., 20:9184
Ranaivo Nomenjanahary, F, An approximate inversion method of geoelectrical sounding data using linear and bayesian statistical approaches. Examples of Tritrivakely volcanic lake and Mahitsy area (central part of Madagascar), 20:8489 (R;XA)
Randall, R.R., Calibration of the radionuclide logging system germanium detector, 20:8410 (R;US)
Rao, M., Atmospheric corrosion monitoring at the US Department of Energy's Oak Ridge K-25 Site, 20:7296 (R;US)
Rapaport, M.S., *See* Baran, A., 20:8588
Raparia, D., *See* Alessi, J.G., 20:8283
Rash, C.D., *See* Levine, D.A., 20:7483
Rashevskij, A., *See* Cheremukhin, A., 20:8378
Rassool, R.P., *See* Kuzin, A., 20:8940
Rathbone, B.A., Evaluation of new and conventional thermoluminescent phosphors for environmental monitoring using automated thermoluminescent dosimeter readers, 20:8396 (R;US)
See Endres, A.W., 20:8397
Ratsimbazafy, J.B., *See* Ranaivo Nomenjanahary, F., 20:8489
Raubenheimer, T., *See* Decker, F.J., 20:8307
Rautian, T.G., *See* Khalturin, V.I., 20:8429
Ray, E.R., Tubular Solid Oxide Fuel Cell Development Program, 20:7918 (RA;US)
Rayl, K.D., Overview of selected molecular biological databases, 20:8553 (R;US)
Raza, S.S., *See* Khan, L.A., 20:7758
Reagan, W.J., The selective catalytic cracking of Fischer-Tropsch liquids to high value transportation fuels. Quarterly technical progress report No. 5, first quarter fiscal year 1993, October 1, 1992–December 31, 1992, 20:7229 (R;US)
Reaney, I.M., *See* Brooks, K.G., 20:8135
Reaven, S.J., A summary of the report on prospects for pyrolysis technologies in managing municipal, industrial, and Department of Energy cleanup wastes, 20:8041 (R;US)
Prospects for pyrolysis technologies in managing municipal, industrial, and DOE cleanup wastes, 20:7542 (R;US)
Redlinger, R., *See* Breitung, W., 20:7794, 20:7799
Reed, D., *See* Boucau, J., 20:7719
Reeder, P.L., *See* Bliss, M., 20:8593
Reeves, J.H., *See* Barabash, A.S., 20:8870
See Farmer, O.T. III, 20:7352
Reffner, J.A., FT-IR microscopical analysis with synchrotron radiation: The microscope optics and system performance, 20:8981 (R;US)
Regalbuto, M.C., *See* Leonard, R.A., 20:7289
Reginato, L., *See* Lee, E., 20:9123
Regulla, D., *See* Till, E., 20:7314
Rehberger, K.M., Apparatus for unloading pressurized fluid, 20:7822 (PA;US)
Rehman, H., *See* Qureshi, R.M., 20:7161
Rehme, K., *See* Huber, R., 20:7802
Reich, F.R., Summary of fiscal year 1994 near-infrared spectroscopy moisture sensing activities, 20:7370 (R;US)
Reich, M., *See* Simos, N., 20:8646
Reichmann, F., The mining Pribram in science and technology. Section O: Mining and the environment, 20:7446 (I;CZ;In Czech)
Reidel, S.P., *See* Johnson, V.G., 20:7455
Reifsnider, K.L., *See* Curtin, W.A., 20:8143
Reinholtz, C., *See* Stoughton, R.S., 20:8244
Reiter, P., *See* Qian Mingsen, 20:7580, 20:7581
Remberg, M., *See* Parkman, H., 20:8541
Renard, C., Safety of plutonium shipments in and from France, 20:7280 (RA;XA)
Renner, M.W., *See* Furenlid, L.R., 20:8179
Rest, J., A phenomenological model for the effect of nanocrystalline microstructure on irradiation-induced amorphization in U_3Si, 20:8112 (R;US)
See Hofman, G.L., 20:7698
Reuter, R., Vacuum Insulation Panels (VIPs), 20:7992 (RA;US)
Rey, C.M., *See* Niemann, R.C., 20:7826
Reynolds, J.F., The development of a generic model for assessing the effects of elevated CO_2 on ecosystems. Progress report, September 1, 1987–May 31, 1988, 20:8569 (R;US)
[Generic ecosystem model for assessing the effects of elevated carbon dioxide on ecosystems]. [Annual] report, July 1, 1988–June 30, 1989, 20:8570 (R;US)
Reynolds, K.D., Summary report of Hanford Site well remediation and decommissioning activities for fiscal year 1994, 20:7493 (R;US)
Reynoso, R., Positronium interactions with transition metals in sodium dodecyl sulfate micellar systems (SDS)., 20:8969 (IA;MX)
Rezania, V., Geometrical and non-geometrical constants of de sitter spacetime, 20:8728 (IA;IR;In English, Persian)
Reznikov, S.G., *See* Afanas'ev, S.V., 20:8376
Rhea, O., *See* Kim, J., 20:8653
Rhee, Bo Wook, Fuel management and safety analysis -A study on the direct use of spent PWR fuel in CANDU reactors-, 20:7683 (R;KR;In Korean)
Rhee, Chang Kyu, *See* Kuk, Il Hiun, 20:8101
Rhee, Yong Joo, *See* Lee, Jong Min, 20:8231
Rhee, Young Joo, *See* Cha, Hyung Ki, 20:8988
See Lee, Jong Min, 20:7516
Rhen, I., *See* Olsson, Olle, 20:7359
Rho, Si Pyo, *See* Lee, Jong Min, 20:7516
Rhu, Ho Sik, *See* Lee, Jae Kyung, 20:7659
Riahi, H., Study of the generalized solutions of n-body type problems with weak forces, 20:8676 (R;XA)
Richard, R.G., *See* Decaire, B.R., 20:8034
Richards, G.A., Aerovalve pulse combustion: Technical note, 20:8266 (R;US)
Richards, P.G., *See* Khalturin, V.I., 20:8429
Richardson, P.E., *See* Yoon, R.H., 20:7097, 20:7135
Richelle, G., Westinghouse computer-based operator support systems, 20:7710 (RA;XA)
Richter, B., Future accelerators and experiments, 20:8296 (R;US)
Richterich, L.R., Cone penetrometer testing at the Hanford Site: Final performance evaluation report, 20:7490 (R;US)
Ridge, T.M., 291-B-1 stack monitoring and sampling system annual system assessment report, 20:7459 (R;US)

Rieksts, G.A., Early operating experience with large-area germanium detectors for detecting low-energy photons, 20:8633 (R;US)
Riethmueller, R., *See* Bernem, K.H. van, 20:8530
Riha, B.D., *See* Rossabi, J., 20:7508
Riley, J.T., *See* Pan, Wei-Ping, 20:7179
Rimondi, F., Study of the structure of the events produced in soft $\bar{p}p$ interactions at $\sqrt{s}$ = 1800 GeV, 20:8789 (R;US)
Rippy, G.L., BCP selector valves and limit switches, 20:7381 (R;US)
Ritter, B., Load capacity analysis of RPV failure, 20:7805 (RA;DE;In German)
Ritter, G.A., Acceptance test procedure, 241-SY-101 Flexible Receiver System, Phase III testing, 20:7392 (R;US)
Rivera, R., *See* Fernandez-Valverde, S., 20:8201
Rizzo, T.G., Extending the kinematic range for W_R searches in e^-e^- collisions at the NLC, 20:8806 (R;US)
Robbins, E.S., Cellular morphometry and cycling cell populations of human and dog bronchi. Annual progress report, April 1, 1994–March 31, 1995, 20:8612 (R;US)
Robbins, G.A., A characterization and evaluation of coal liquefaction process streams. Quarterly technical progress report, June 29–September 30, 1994, 20:7138 (R;US)
Roberto, J.B., Oak Ridge National Laboratory Core Competencies, 20:7876 (R;US)
Roberts, C.D., *See* Frank, M.R., 20:8826
Roberts, D., *See* Barker, C.E., 20:8273
Roberts, M.L., *See* Anz, S.J., 20:8176
Robins, W.H., *See* Zemanian, T.S., 20:8464
Robison, G., *See* Gee, J.M., 20:7592
Roch, P., Sustainability: ecology comes of age, 20:7838 (IA;CH)
Roche, M.F., *See* Krumpelt, M., 20:7924, 20:7925, 20:7927, 20:7928
Rockey, J.M., Pilot gasification and hot gas cleanup operations, 20:7108 (R;US)
Rodgers, J.C., *See* Ferenbaugh, R.W., 20:7477
Rodriguez-Gonzalez, E., Spectrophotometric method for the determination of Thorium in urine using anionic resin and arsenazo (III)., 20:8159 (IA;MX)
Roedder, P., *See* Axmann, A., 20:7785
Roepke, G., *See* Blaschke, D., 20:8835
Rogachevskij, O.V., *See* Ermakov, K.N., 20:8932
Rogers, C.S., *See* Knapp, G.S., 20:8309
Rogers, D.W.O., *See* Nelson, W.R., 20:8950
Rogov, A.D., *See* Novikov, A.G., 20:8346
Roh, N.S., *See* Kim, D.C, 20:7188
Rohatgi, A., *See* Chen, Z., 20:7587
See Doshi, P., 20:7595
Rohen, W.T., *See* Moshofsky, R.P., 20:9151
Rohlfing, C.M., *See* Jacobs, S.J., 20:8193
Rohloff, F., Radiation exposure due to gamma-ray submersion, 20:7753 (R;DE;In German)
Rohrbach, F., Massively Parallel Processing. A need for future High Energy Physics experiments., 20:9174 (RA;HU)
Rohrich, K., *See* Hamann, N., 20:8819
Rojas, A., *See* Becerril, A., 20:8215
Rollstin, J.A., *See* Helton, J.C., 20:7820, 20:8509
Romano, A.J., *See* Ogeka, G.J., 20:9127
Romano, P., *See* Zasadzinski, J., 20:8117
Romanovskij, E.A., Measurement of TiN_x stoichiometry by the method of nuclear proton backscattering, 20:8986 (IA;RU;In Russian)
Romanow, A., *See* Floyd, S., 20:9179
Rome, M., *See* Davydenko, V.I., 20:9042
Romero Juarez, M. A., Identification of irradiated mangoes by the electron spin resonance technique., 20:8204 (IA;MX)
Romero, A.E. Jr., Seismic monitoring at the Geysers Geothermal Field, 20:7605 (R;US)
Romine, C.H., *See* D'Azevedo, E.F., 20:9181
Romine, R.A., *See* Freeman, H.D., 20:7341
Ron, S., Application of square integrable basis functions for scattering problems. A comparison between approaches based on Toeplitz matrices and negative imaginary potentials, 20:8661 (RA;IL)
Ronen, Y., *See* Paran, J., 20:8360
Roney, P., *See* Barnes, D., 20:9125
Ropp, M., *See* Doshi, P., 20:7595
Rosen, R., On the Schroedinger question, 20:8564 (RA;US)
Rosenberg, R.A., *See* Li, Y., 20:8332
Rosenfeld, Y., Adiabatic pair potential for charged particulates in plasma and electrolytes, 20:8692 (RA;IL)
Onsager-molecule approach to screening potentials in strongly coupled plasmas, 20:8691 (RA;IL)
Rosenquist, G., *See* Turiel, I., 20:7982
Roshal, A.A., *See* Mironenko, V.A., 20:7326
Ross, M., *See* Hendrickson, L., 20:8308
Ross, R.H., *See* Davis, J.R., 20:7431
Rossabi, J., Passive control of VOCs using valved well heads: FY1994 report, 20:7508 (R;US)
Rosseinsky, M.J., *See* Schirber, J.E., 20:8147
Rossel, C., *See* Blatter, J., 20:9032
Rossmanith, R., *See* Emma, P., 20:8306
Rossouw, C.J., Zone axis backscattered electron contrast for fast electrons, 20:9013 (R;AU)
See Josefsson, T.W., 20:9018
Roter, T., *See* Shappir, J., 20:8403
Roth, R., The evaluation of potential limonene scavengers, 20:8466 (R;US)
Rouanet, E., Study and realization of a power circuit of a superconducting dipole generator of a magnetic field, 20:9097 (R;FR;In French)
Roussin, R.W., *See* Ingersoll, D.T., 20:7648
Roux, N., *See* Billone, M.C., 20:7674
Rowland, R.E., Radium in humans: A review of U.S. studies, 20:8608 (R;US)
Rowson, P.C., Precision electroweak physics with the SLD/SLC: The left-right polarization asymmetry, 20:8770 (R;US)
Royl, P., *See* Breitung, W., 20:7794, 20:7799
Rozeveld, S., Microstructure and composition of a SNS Josephson junction using $CaRuO_3$ as the metallic barrier, 20:9026 (R;US)
Rozhkov, A.A., *See* Kovalevsky, M.Yu., 20:8699
Ruan Chenggeng, Monoclonal antibody (SZ-51) specific for activated platelets is useful in the diagnosis of thrombosis. Final report for the period December 1990 - April 1994, 20:8589 (R;XA)
Rubinfeld, S., *See* Stotland, A., 20:8599
Ruby, D., *See* Chen, Z., 20:7587
See Doshi, P., 20:7595
See Witt, C.E., 20:7596
Ruby, D.S., A statistical analysis of the effect of PECVD deposition parameters on surface and bulk recombination in silicon solar cells, 20:7588 (R;US)
Ruckman, M., *See* Jacobsen, F., 20:8415
Rudge, A.J., Electrochemical supercapacitors, 20:7832 (PA;US)
Ruggiero, A.G., Crystalline beams: Theory, experiments, and proposals, 20:8300 (R;US)
Ruiter, A.J.M., Lightning protection of the Fokker 100 CFRP rudder, 20:8240 (RA;DK)
Rumynin, V.G., Development of hydrogeological modelling approaches for assessment of consequences of hazardous accidents at nuclear power plants, 20:8499 (R;US)
See Mironenko, V.A., 20:7326
Ruoff, H., *See* Sturm, D., 20:7787
Rusakova, V.V., *See* Belaga, V.V., 20:8935
Rusek, A., Search for strangelets and other rare objects in Au + Pt collisions at the AGS using a fixed-angle focusing spectrometer, 20:8879 (R;US)
Ruskov, R., *See* Radyushkin, A.V., 20:8764
Russell, A.J., *See* Scott, C.D., 20:7570
Russell, L., *See* Kero, R., 20:9188
Rustad, J.R., *See* Felmy, A.R., 20:7348
Ruth, R.D., *See* Huang, Zhirong, 20:8326
Rutten, J., *See* Rockey, J.M., 20:7108
Ruzicka, J., On Optical Transition Radiation of Charged Particles in SiO_2-Aerogels, 20:9010 (R;XJ;In Russian)
See Bojko, I.R., 20:8386
Ryding, D., *See* Li, Y., 20:8332
Rytkoenen, T., *See* Qian Mingsen, 20:7580, 20:7581
Ryu, Woo Seog, *See* Hong, Jun Hwa, 20:8099
Ryu, Woo Seong, A study on the thermal and mechanical properties of inconel for steam generator U-tube, 20:7693 (R;KR;In Korean)
Ryutov, D.D., *See* Davydenko, V.I., 20:9042
Ryutov, R., Mirror type plasma neutron source, 20:9119 (IA;DE)

S

Sabbagh, S.A., *See* Bush, C.E., 20:9079
Sadagashvili, M.I., *See* Guldamashvili, A.I., 20:8095
Sagartz, M.J., Violent reaction source term study, 20:8425 (R;US)
Saher, D., *See* Izrajlev, F.M., 20:8660
Sahimi, M., *See* Tsotsis, T.T., 20:7136
Saito, M., *See* Satoh, T., 20:7732
Saitov, I.S., *See* Aksinenko, V.D., 20:8387
Sajjad, M.I., Standardization of $^{13}CO_2$ production procedure from organic matter for mass spectrometric analysis, 20:8174 (R;PK)
See Mashiatullah, A., 20:8545
See Qureshi, R.M., 20:7161
Sakamoto, K., Photonuclear reactions of complex nuclei at intermediate energies., 20:8912 (IA;MX)
See Shibata, S., 20:8160
Saldin, E.L., Free Electron Laser as Energy Driver for Inertial Confinement Fusion, 20:9105 (R;XJ)
On a Possibility to Construct High-Intensity Monochromatic Gamma-Source at HERA and LEP, 20:8322 (R;XJ)
Salerno, R., *See* Stoughton, R.S., 20:8244
Salmon, R., Operating cost guidelines for benchmarking DOE thermal treatment systems for low-level mixed waste, 20:7336 (R;US)
Salomov, D.A., *See* Belaga, V.V., 20:8935
Saltmarsh, M.J., The high intensity D-Li source, 20:7526 (IA;DE)
See Roberto, J.B., 20:7876
Samara, G.A., *See* Vook, F.L., 20:7880
Samarin, V.V., Green profile function technique at the description of ion implantation in the case of axis channeling, 20:9005 (IA;RU;In Russian)
Samei, E., Computer simulation and characterization of glow curve in contact heating of thermoluminescent detectors, 20:8374 (IA;IR;In English, Persian)
Samios, N.P., Baryon spectroscopy and the omega minus, 20:8824 (R;US)
Sammells, A.F., Perovskite solid electrolytes for SOFC, 20:7933 (RA;US)
Sample, B.E., Estimating exposure of terrestrial wildlife to contaminants, 20:8641 (R;US)
See Suter, G.W. II, 20:7473
Sams, T., *See* Gudbjerg, E., 20:8029
Sanchez, V., *See* Zaldivar, M.E., 20:8206
Sano, H., Emission Moessbauer spectroscopic studies on mixed valence states of Fe-57 atoms produced in Co-57 labelled trinuclear cobalt-iron carboxylates., 20:8157 (IA;MX)
Santa, T.S., Residential fuel quality study (Part II), 20:7953 (RA;US)
Santa-Maria, J., *See* Kelly, D.M., 20:8991
Santini, D.J., Transportation technology transitions and macroeconomic growth – Contemporary evidence, 20:8010 (R;US)
See Wang, M.Q., 20:7849
Saos, J.L., *See* Fall, M., 20:8451
Saphier, D., Evaluation of the SMOLENSK-3 NPP shutdown system. Phase I: code implementation and testing. First progress report, 20:7667 (R;CH)
Sarangapani, S., Macrocyclic redox promoters for direct methanol fuel cells, 20:7932 (RA;US)
Sarantsev, V.P., *See* Saldin, E.L., 20:8322, 20:9105
Sarathi, P., Field application of in situ combustion – past performance/future application: Proceedings, 20:7227 (R;US)
Sarbishe-ee, M., Quantum tunnelling and Heisenberg equation of motion, 20:8729 (IA;IR;In English, Persian)
Sarff, J.S., Transport reduction by current profile control in the reversed field pinch, 20:9044 (R;US)
Sariel, J., *See* Kimmel, G., 20:8155
Sarofim, A.F., The structure of combustion-generated aerosol particles, 20:8439 (RA;FI)
See Flytzani-Stephanopoulos, M., 20:8436
See Helble, J.J., 20:7175
See Lee, C.H., 20:7170
Sass, R., *See* Hendrickson, L., 20:8308
Sato, T., *See* Sano, H., 20:8157
Satoh, T., Development of an advanced man-machine system for Japanese PWR plants, 20:7732 (RA;XA)
Sault, A.G., *See* Martino, A., 20:8194
Saunders, R.S., Microporous polyimide films for reduced dielectric applications, 20:8148 (R;US)
Savijaervi, H., *See* Korhonen, P., 20:8442
Saxena, A., *See* Habib, S., 20:8704
Sazonov, N.P., *See* Gorelov, A.I., 20:7727
Sbarra, C., *See* Anderson, D.F., 20:8347
Scadron, M.D., *See* Coon, S.A., 20:8867
Schaefer, L., Metallurgical and mechanical tests on the low activating martensitic chromium steel OPTIFER-IV, 20:8102 (R;DE;In German)
Schalk, W.W., *See* Baskett, R.L., 20:8645
Schanz, G., *See* Hofmann, P., 20:7793, 20:7812
See Leistikow, S., 20:7813
Schechter, D.S., *See* Grigg, R.B., 20:7220, 20:7221
Scheer, S., Using knowledge based systems for rams analysis and online operator support of nuclear power plants, 20:7740 (RA;XA)
Schei, A., Lightning protection of wind turbine generator systems. Service experience from Norway and proposed solutions to reduce lightning damage, 20:7612 (RA;DK)
Schejbal, C., *See* Nemec, V., 20:9165
Schenewerk, P.A., Assist in the recovery of bypassed oil from reservoirs in the Gulf of Mexico. Quarterly status report (final), July 1–September 30, 1994, 20:7201 (R;US)
Schichtel, T., *See* Benz, G., 20:7816
Schildt, G.H., A double-channelled safety critical process visualization, 20:7724 (RA;XA)
Schilf, L., The MBB-Vacuum Super Insulation (VSI), 20:7989 (RA;US)
Schiller, P., The role of intense neutron sources and other irradiation facilities in materials development, 20:9115 (IA;DE)
Schilling, K., *See* Glaessner, U., 20:8712
Schirber, J.E., Effect of He pressure on the superconducting transition temperatures of Na_2CsC_{60} and $(NH_3)_4Na_2CsC_{60}$, 20:8147 (R;US)
See Myers, S.A., 20:8175
Schleich, C., *See* Schreiber, G.A., 20:8601
Schleisiek, K., *See* Goeller, B., 20:7801
See Krieg, R., 20:7796
Schlueter, E.M., Predicting the transport properties of sedimentary rocks from microgeometry, 20:8647 (R;US)
Schlueter, R., Undulators for short wavelength FEL amplifiers, 20:8270 (R;US)
Schmidt, A.J., Organic destruction to enhance the separation of strontium in radioactive wastes, 20:7351 (R;US)
Schmidt, H., *See* Erbacher, F.J., 20:7809
Schmidt, S., *See* Blaschke, D., 20:8835
Schmidt, U., Problems concerning the accumulation of isolated plutonium - Situation in Germany, 20:7268 (RA;XA)
Schmitt, H., *See* Dillmann, H.G., 20:7808
Schmuck, P., *See* Henneges, G., 20:7811
Schneider, R.P., *See* Bryan, R.P., 20:8272
Schneider, T.C., Project W-340 long reach arm retrieval system balance of plant instrumentation workshop engineering study, 20:7389 (R;US)
Schobert, H.H., Advanced thermally stable jet fuels. Technical progress report, January 1994–March 1994, 20:7247 (R;US)
Schoeling, L.G., A model technology transfer program for independent operators: Kansas Technology Transfer Model (KTTM), 20:7202 (R;US)
Scholl, R., *See* Hangarter, R., 20:8597
Scholten, O., *See* Wolf, A., 20:8857
Scholtyssek, W., *See* Henneges, G., 20:7811
Schon, T., The chemical behaviour of iodine-129 in the process of radwaste conditioning, 20:7319 (R;DE;In German)
Schreiber, G.A., Gas chromatographic analysis of volatile hydrocarbons to detect irradiated chicken, pork and beef - an intercomparison study. A report in English and German, 20:8600 (R;DE;In English, German)
Thermoluminescence analysis to detect irradiated spices, herbs and spice-and-herb mixtures - an intercomparison study. A report in English and German, 20:8601 (R;DE;In English, German)
Schreiber, R.D., Tank 241-C-102 tank characterization plan, 20:7417 (R;US)
Schriver, P., *See* Gudbjerg, E., 20:8029
Schroeder, C.C., *See* Felmy, A.R., 20:8192

Schroeder, J.L., *See* Lagasse, R.R., 20:8146
Schroeder, V., *See* Vitus, C.M., 20:8072
Schubert, R., Climate change and discount rates, 20:7893 (RA;CH)
Schubert, S.E., *See* Thorne, P.D., 20:8512
Schubert, W.K., *See* Gee, J.M., 20:7592
Schuele, O., *See* Benz, G., 20:7816
Schueler, C., *See* Blatter, J., 20:9032
Schuetz, W., *See* Jacobs, H., 20:7795
Schuhmann, R.B., *See* Wolf, A., 20:8856
Schuller, I.K., *See* Kelly, D.M., 20:8991
Schulzki, G., *See* Schreiber, G.A., 20:8600
Schumacher, G., *See* Hofmann, P., 20:7812
See Huber, R., 20:7802
Schunemann, A.A., *See* Nunez, E.F., 20:8613
Schuster, P., Biopolymer sequences and structures, 20:8565 (RA;US)
Schutzenhofer, G.L., *See* Reich, F.R., 20:7370
Schwartz, M.M., The selective catalytic cracking of Fischer-Tropsch liquids to high value transportation fuels. Quarterly technical status report for first quarter fiscal year, 1994 - report No. 41, October 1, 1993–December 31, 1993, 20:7230 (R;US)
Schwartz, S.E., Microphysical and compositional influences on shortwave radiative forcing of climate by sulfate aerosols, 20:8431 (R;US)
Schwarz, J., Cooling and air conditioning with water/zeolite, 20:7996 (RA;US)
Schwarz, J.A., Hydrogen storage on activated carbon. Final report, 20:7536 (R;US)
Schwenk, R.M., Economic transition FY 1995 Multi-Year Program Plan (MYPP)/Fiscal Year Work Plan (FYWP) WBS 7.4.9, 20:9152 (R;US)
Schwinkendorf, K.N., Criticality safety evaluation report for K Basin filter cartridges, 20:7376 (R;US)
Scorodumov, V.A., Creation of a computerized operator support system at Unit 5 of the Novovoronezh Nuclear Power Plant, 20:7729 (RA;XA)
Scott, C.D., Bioprocessing in nonaqueous media - critical needs and opportunities, 20:7570 (R;US)
Scott, P.L., Design review report FFTF interim storage cask, 20:7283 (R;US)
Scott, T.C., *See* Scott, C.D., 20:7570
Scroppo, J., Status of Unocal product development testing, 20:7944 (RA;US)
Scroppo, J.A., *See* Figueroa, R.A., 20:7942
Sczichman, H., *See* Last, I., 20:8186
Seed, T.M., Hematopoietic tissue repair under chronic low daily dose irradiation, 20:8607 (R;US)
Segev, M., PROSDOR: An IBM-3090 based semi-automated procedure linking HERMES MCNP and KORIGEN for the burnup analysis of accelerator driven cores, 20:7322 (R;DE)
Sehrehehtehr, Zh., Equipment for Measurement ICE and e-γ-Coincidence Spectra, 20:8383 (R;XJ;In Russian)
See Usmanov, P.N., 20:8865
Sehrgehlehn, B., *See* Baatarkhuu, D., 20:8292
Seidl, P., *See* Lee, E., 20:9123
Selkowitz, S.E., *See* Lee, E.S., 20:7981
Sellers, R., *See* Witt, C.E., 20:7596
Sellin, P., *See* Widen, H., 20:7361
Selman, J.R., Fuel cells - an international perspective, 20:7945 (RA;US)
Investigation of wetting phenomena and oxidation/lithiation behavior of nickel in molten carbonate, 20:7935 (RA;US)
Selyugin, O.V., *See* Goloskokov, S.V., 20:8800
Semenov, P.A., *See* Golovin, V.M., 20:8368
Semyannikov, V.E., *See* Prilepo, V.L., 20:8090
Sengpiel, W., Investigation of in-vessel accident sequences, 20:7815 (RA;DE;In German)
Sengupta, S., *See* Todt, V.R., 20:8118
Seo, H.S., A Study on energy oriented intelligent building system(II) - development of emulator/tester, 20:7975 (R;KR;In Korean)
See Tae, C.S., 20:7974
Seo, In Seok, *See* Kim, Yong, 20:9139
Seo, J.M., *See* Sim, K.S., 20:7535, 20:7569
Seo, Ki Seok, *See* Park, Hyun Soo, 20:7672
Seo, Kyeong Won, *See* Chang, Si Young, 20:8623
Seo, Yong Chil, *See* Kim, Seung Ho, 20:8236
Seok, Ho Cheon, Design and analysis of CANDU advanced fuel - Development of the advanced CANDU technology-, 20:7669 (R;KR;In Korean)
Development of advanced CANDU PHWR -Development of the advanced CANDU technology-, 20:7673 (R;KR;In Korean)
See Choi, Chang Beom, 20:7671
See Kim, Yong Seong, 20:7773
Seok, Soo Dong, *See* Seok, Ho Cheon, 20:7673
Seol, Chang Woo, *See* Hwang, Sung Tai, 20:7678
Seong, Baek Seok, *See* Kim, Huhn Jun, 20:8391
Seong, J.S., *See* Cho, S.C., 20:8026
See Yang, J.H., 20:7830
Seong, Ki Ung, *See* Chung, Heung Seok, 20:7515
Seong, Tae Yong, *See* Park, Chang Kyu, 20:9171
Sepold, L., *See* Hofmann, P., 20:7793, 20:7812
Serdyuk, I.N., *See* Maayouf, R.M.A., 20:8947
Sergeenko, M.N., On perturbative asymptotic of Regge trajectories, 20:8725 (R;XA)
Sergienko, V.A., *See* Veselov, G.V., 20:8382
Serie, P.J., *See* Vick, J.D., 20:7864
Serrano, J., *See* Reynoso, R., 20:8969
Sesnic, S., *See* Talvard, M., 20:9083
Sessler, A., *See* Li, H., 20:8304
Sessler, A.M., The cooling of particle beams, 20:8305 (R;US)
See Li, H., 20:8303
Setchell, R.E., Reduction in fiber damage thresholds due to static fatigue, 20:8131 (R;US)
Setter, A., *See* Brannon, E., 20:7578
Setter, N., *See* Brooks, K.G., 20:8135
Sevim, H., *See* Chugh, Y.P., 20:7153
Sextl, G., *See* Reuter, R., 20:7992
Shadrukhin, M.G., *See* Tashlykov, I.S., 20:8166
Shaffer, F.D., Fluorescent image tracking velocimeter, 20:8592 (PA;US)
Shah, N., *See* Helble, J.J., 20:7175
Shah, Z., *See* Mashiatullah, A., 20:8545
See Qureshi, R.M., 20:7161
Shaked, H., Defect structure and superconducting properties of $La_{1.8}Sr_xCa_{1.2-x}Cu_2O_{6-\delta}$, 20:8083 (RA;IL)
Shalaev, V., *See* Markel, V.A., 20:8980
Shamai, Y., *See* Lifshitz, Y., 20:8407
Shang, S., *See* Bookless, W.A., 20:9129
Shankland, I.R., *See* Decaire, B.R., 20:8034
Shapiro, B.J., Human Reliability Analysis for In-Tank Precipitation Alignment and Startup of Emergency Purge Ventilation Equipment. Revision 3, 20:7505 (R;US)
Shappir, J., Radiation and high-field-induced interface state generation in MOS structures with modified nitrided oxide, 20:8403 (RA;IL)
Sharipova, S.A., *See* Bekmirzaev, R.N., 20:8933
Shashkin, S.L., *See* Novikov, V.V., 20:7731
Shaw, D.S., Effective Lagrangian approach to the fermion mass problem, 20:8772 (R;AU)
Shchepillo, V.V., *See* Golovin, V.M., 20:8368
Shelton, R.B., *See* Roberto, J.B., 20:7876
Shem, L.M., Pipeline corridors through wetlands – Impacts on plant communities: Little Timber Creek Crossing, Gloucester County, New Jersey. Topical report, August 1991–January 1993, 20:7253 (R;US)
Pipeline corridors through wetlands – Impacts on plant communities: Norris Brook Crossing Peabody, Massachusetts, 20:7254 (R;US)
See Van Dyke, G.D., 20:7252
Shemesh, Y., *See* Ellenbogen, E., 20:8358
See Levinson, S., 20:8363
See Wengrowicz, U., 20:8359
Shen Jianmin, Dressing symmetry of the uniformization solution of Liouville equation, 20:8675 (R;XA)
Shen Qingbiao, *See* Cai Chonghai, 20:9155, 20:9156
See Cai Dunjiu, 20:8892
See Liang qichang, 20:8891

Shen, B.W., Contribution of ankyrin-band 3 complexes to the organization and mechanical properties of the membrane skeleton of human erythrocyte, 20:8552 (R;US)
Shen, D.S., Micro heat spreader enhanced heat transfer in MCMs, 20:8279 (R;US)
See Adkins, D.R., 20:8257
Shen, Y.R., Nonlinear optics and organic materials, 20:8705 (R;US)
See Xiao, X.D., 20:8103
Sheo, Seung Won, *See* Choi, Chang Beom, 20:7671
Shepodd, T.J., *See* Roth, R., 20:8466
Shestakov, V.M., *See* Mironenko, V.A., 20:7326
Shi Jun, *See* Qian Mingsen, 20:7580, 20:7581
Shi Xiangjun, *See* Zhou Delin, 20:8893
Shi Yi, *See* Zhou Yongyi, 20:8884
Shi Zhaomin, *See* Tang Guoyou, 20:8885
Shiao, S.Y., Removal of pyrite and trace elements from waste coal by dissolved-CO_2 flotation and chelating agents. Final technical report, September 1, 1993–August 31, 1994, 20:7098 (R;US)
Shibata, S., ^{10} Be and ^{26} Al production cross sections with 12 GeV protons measured by accelerator mass spectrometry., 20:8160 (IA;MX)
Shim, Hae Seop, *See* Kim, Huhn Jun, 20:8391
Shim, Ki Seop, *See* Choi, Chang Beom, 20:7671
See Seok, Ho Cheon, 20:7669
Shimanskaya, T.M., Program for calculation of two-dimensional nonstationary temperature fields in NPP arbitrary geometrical element, 20:7691 (R;RU;In Russian)
Shimanskij, A.A., *See* Shimanskaya, T.M., 20:7691
Shimanskij, S.S., *See* Saldin, E.L., 20:8322
Shimon, O., *See* Pelled, O., 20:8361
Shin, Byung Chul, *See* Kim, Jae Rok, 20:7519
Shin, D.H., *See* Kim, D.C, 20:7188
Shin, D.Y., Study on energy efficiency standard for clothes washers and promoting the spread of high efficiency motors, 20:8237 (R;KR;In Korean)
Shin, H.S., Efficiency evaluation and plan for extensive use of newly developed energy saving products- OA equipment energy saver and vehicle fuel economizer, 20:7977 (R;KR;In Korean)
See Oh, C.S., 20:7976
Shin, Hun Young, *See* Kim, Jae Rok, 20:7519
Shin, In Chul, *See* Lee, Young Il, 20:8624
Shin, Jang Soo, Applications of optical fiber to the remote fluorescence analysis, 20:8388 (R;KR;In Korean)
See Cha, Hyung Ki, 20:8988
See Kim, Chul Jung, 20:8702
Shin, Jeong Cheol, *See* Seok, Ho Cheon, 20:7673
Shin, Jin Myoung, *See* Yoon, Myoung Hwan, 20:8170
Shin, Jin Myung, *See* Yoon, Myung Hwan, 20:8189
Shin, K.S., *See* Seo, H.S., 20:7975
See Tae, C.S., 20:7974
Shin, Won Churl, *See* Choi, Byung Ho, 20:9011
Shin, Yeong Joon, *See* Yoo, Jae Hyeong, 20:8188
Shirokov, E.V., *See* Alimov, A.S., 20:8921
Shirokovskij, I.V., *See* Lazarev, Yu.A., 20:8931
Shiver, A.W., *See* Helton, J.C., 20:7820, 20:7821, 20:8509
Shkrob, I.A., Pulse radiolysis of alkanes: A time-resolved electron paramagnetic resonance study, 20:8197 (R;US)
Shmuely, M., *See* Paran, J., 20:8360
Shnejdmiller, E.A., *See* Saldin, E.L., 20:8322, 20:9105
Sho, Dong Seop, *See* Cho, Man, 20:7677
Shoaee, H., *See* Hendrickson, L., 20:8308
Shouse, K., *See* Bourn, G., 20:8064
Shu, D., *See* Job, P.K., 20:8298
Shu, Kyung Suk, A study on the ocean circulation and thermal diffusion near a nuclear power plant, 20:7757 (R;KR;In Korean)
Shu, Sang Moon, *See* Lee, Jung Woon, 20:9145
Shulbo, Pan, Chinese-Finnish cooperative research work on dam break hydrodynamics, 20:7582 (RA;FI)
Shumakov, A.V., *See* Alimov, A.S., 20:8921
Shuvalov, R.S., *See* Konstantinov, V.F., 20:8370
See Krasnokutskij, R.N., 20:8369
Shvedunov, V.I., *See* Alimov, A.S., 20:8921
Siamwiza, R.J., *See* Chiw, P., 20:8009
Sidoro, M., Impact of environmental isotopes in the fissured aquifer study in Mali, 20:8482 (RA;XA;In French)
Sidorov, A.I., *See* Murphy, J.E., 20:8686
Siegel, J., *See* Davis, B., 20:7960
Siegel, R.W., Nanostructured materials, 20:8972 (R;US)
See Suits, B.H., 20:8136
Siegrist, M.R., *See* Urban, M., 20:9075
Siemann, R.H, Status and future prospects for United States accelerators and accelerator physics, 20:8281 (R;US)
Siemann, R.H., Linear collider research and development, 20:8297 (R;US)
Siemiarczuk, T., *See* Gaitinov, A.Sh., 20:8924
Siems, G., Gamma spectroscopy for examination of light Ba isotopes after beta decay, 20:8869 (I;DE;In German)
Sikka, V.K., Synthesis of Ni_3Al and NiAl intermetallics, 20:8075 (R;US)
Silagadze, Z.K., SO(8) colour as possible origin of generations, 20:8713 (R;RU)
See Bratkovskaya, E.L., 20:8801
Silar, J., *See* Nemec, V., 20:9165
Silveira, S., African voices on climate change. Policy concerns and potentials, 20:7862 (R;SE)
Silverman, E.B., SAMSON: Severe accident management system on-line network, 20:7743 (RA;XA)
Sim, Bong Shick, The development of human factors experimental evaluation techniques -The development of human factors technologies-, 20:7750 (R;KR;In Korean)
Sim, Byeong Seop, *See* Suh, Doo Whan, 20:7771
Sim, K.S., Study on the hydrogen reaction technologies related to the chemical heat pump system (II), 20:7535 (R;KR;In Korean)
Study on the production of alternative fuels by carbon dioxide hydrogenation (I), 20:7569 (R;KR;In Korean)
See Son, J.I., 20:8457
See Son, Y.M., 20:8456
Sim, Seok Koo, *See* Chang, Won Pyo, 20:9169
See Yoo, Kun Joong, 20:7665
Sim, Yoon Sub, Thermal-Hydraulics of a steam discharge system, 20:7663 (R;KR;In Korean)
See Yoo, Geun Jong, 20:8252
Simmons, F.M., Hanford analytical sample projections FY 1995–FY 2000. Revision 1, 20:7413 (R;US)
Simos, N., Seismic analysis of the Par Pond Dam: Study of slope failure and liquefaction. Technical evaluation report, 20:8646 (R;US)
Simpson, P.L., *See* Berger, D.J., 20:7125, 20:7127
Simpson, R.L., Characterization of ultradispersed aluminum, 20:8111 (R;US)
Sims, D.A., *See* Kuzin, A., 20:8940
Sin, In Cheol, *See* Yoo, Jang Ryoel, 20:8603
Singer, L., *See* Lifshitz, Y., 20:8407
Sinquefield, S.A., A laminar entrained flow reactor for the study of aerosol formation and deposition during black liquor combustion and pyrolysis, 20:7545 (RA;FI)
Sinton, J.E., *See* Liu Zhiping, 20:8027
Sipilae, K., JALO - Fuel conversion. Final report on the energy research programme 1988-1992, 20:7547 (R;FI)
Sipser, M., *See* Greenberg, D.S., 20:8576
Sirazhet, Kh., *See* Baatarkhuu, D., 20:8292
Sirkar, K.K., *See* Bhown, A.S., 20:7635
Sirotkova, D., The Institute's view of the use of wastes for environmental remedial actions and land reclamation, 20:8493 (IA;CZ;In Czech)
Sisk, E.C., *See* Fuciarelli, A.F., 20:8632
Sissoko, M., *See* Alpha, A., 20:8534
Sissoko, M.F., In situ measurements of suspended sediment transport in the wadi dourou ("pays Dogon" - Mali), 20:8487 (RA;XA;In French)
Sitar, Z., *See* Treflik, L., 20:7711
Sivakov, A.A., *See* Anosov, A.I., 20:7725
Sjoebris, A., *See* Flodstroem, E., 20:8014
Sjoeland, K.A., Nuclear reaction analysis - Development and application, 20:8394 (R;SE)
Skaare, P.E., Experimental investigation of an equilibrium boundary layer in strong adverse pressure gradient, 20:8253 (R;NO)

Skiba, O.V., Civil plutonium handling experience in the production of fuel, fuel elements and assemblies for fast reactors, 20:7676 (RA;XA)
Skibin, D., The use of aircraft for environmental monitoring in nuclear accidents, 20:8449 (RA;IL)
Skiles, J.W., *See* Reynolds, J.F., 20:8569
Skinner, C.H., *See* Suckewer, S., 20:8275
Skjerk Christensen, P., Wind energy market study Eastern Europe. Czech and Slovak Republics, 20:7609 (R;DK)
Wind energy market study Eastern Europe. Poland, 20:7610 (R;DK)
Skoglund, P., Specific heat capacity and melting/crystallisation characteristics of polytridecanolactone, 20:8052 (RA;SE)
See Fransson, Aake, 20:8050
Skok, A., *See* Bernard, R., 20:7926, 20:7943
Slagle, O.D., In situ tritium from Li_2O and Li_2ZrO_3 irradiated in a fast neutron flux: BEATRIX-II, Phase 1 and 2, 20:9124 (R;US)
Slater, C.O., *See* Ingersoll, D.T., 20:7648
Slimane, R.B., *See* Hepworth, M.T., 20:7104
Slovak, J., *See* Manour, J., 20:7449
Smagin, M.N., *See* Romanovskij, E.A., 20:8986
Smelcer, D.R., *See* Adkisson, B.P., 20:9149
Smirnov, A.S., *See* Maayouf, R.M.A., 20:8947
Smirnov, G.I., A Study of the A Dependence of the Deep Inelastic Scattering of Leptons and Implications for Understanding of the EMC Effect, 20:8796 (R;XJ)
Smirnov, L.S., The Neutron Powder Diffraction and Acoustic Investigations of the NH_4SCN Phase Diagram, 20:9009 (R;XJ)
Smirnov, S.P., *See* Anikanov, S.S., 20:7721
Smith, A.E., The effect of a non-hermitian crystal potential on the scattering matrix in reflection electron diffraction, 20:9017 (R;AU)
See Josefsson, T.W., 20:9016
Smith, B., *See* Gropp, W., 20:9153
Smith, D.L., *See* Chung, H.M., 20:8070, 20:9093
Smith, J.D., NSLS control system upgrade, 20:8311 (R;US)
Smith, L., *See* Bourn, G., 20:8064
Smith, M.H., *See* Frome, E.L., 20:8644
Smith, M.R., *See* Farmer, O.T. III, 20:7352
Smith, P.N., *See* Boyack, B.E., 20:7817
Smith, V., *See* Wehner, S., 20:7224
Smith, W.A., *See* McCabe, D.J., 20:7433
Smutnev, V.I., Man-machine systems in the nuclear power industry, 20:7735 (RA;XA)
Snavely, K., *See* Subramaniam, B., 20:7567
Snelgrove, J.L., *See* Hofman, G.L., 20:7698
Snyder, T.R., Fundamental mechanisms in flue gas conditioning. Quarterly report, July 1994–September 1994, 20:7156 (R;US)
So, Dong Sup, *See* Sim, Yoon Sub, 20:7663
Sobolev, Yu.G., *See* Kuznetsov, I.V., 20:8915
Soden, J.M., *See* Anderson, R.E., 20:8222
Sodnom, N., *See* Baatarkhuu, D., 20:8292
Soe, In Seok, *See* Lee, Han Young, 20:9199
Soe, Kyeong Seok, *See* Lee, Young Bok, 20:7754
Soerensen, P., *See* Larsen, G.C., 20:7624
Soetrisno, M., *See* Wong, C.C., 20:8255, 20:8256
Sohn, Dong Seong, The development of nuclear fuel for the future, 20:7704 (R;KR;In Korean)
See Lee, Jae Kyung, 20:7659
Sohn, Surg Won, *See* Kim, Seung Ho, 20:8230
Soisson, F., Ordered compounds under irradiation: dynamical equilibrium phase diagrams and microstructural evolutions, 20:8074 (R;FR;In French)
Sokolov, V.N., *See* Bojko, E.B., 20:9001
See Komarov, F.F., 20:9002
Sokolov, V.V., Mixing phases of unstable two-level systems, 20:8847 (R;RU)
See Izrajlev, F.M., 20:8660
Sokolov, Yu.V., *See* Budnik, A.P., 20:8961
Sollid, J.E., Soil pore-gas sampling by photoacoustic radiometry, 20:7324 (R;US)
Solnicka, H., *See* Hemer, M., 20:8453
Solodukhin, S.N., The Conical Singularity and Quantum Corrections to Entropy of Black Hole, 20:8657 (R;XJ)
Solomon, L., *See* Stefan, P.M., 20:8312
Solorza Feria, O., *See* Fernandez-Valverde, S., 20:8201
Solov'ev, A.I., *See* Smirnov, L.S., 20:9009
Solov'ev, M.I., *See* Ermakov, K.N., 20:8932
Solov'ev, V.S., *See* Gajduk, P.I., 20:8996
Solovioff, G., *See* Abramov, A., 20:9101
See Abramov, E., 20:9100
Somasundaram, S., *See* Katipamula, S., 20:7600
Somasundaran, P., Surfactant loss control in chemical flooding: Spectroscopic and calorimetric study of adsorption and precipitation on reservoir minerals. Quarterly technical progress report, April 1, 1994–June 30, 1994, 20:7210 (R;US)
Surfactant loss control in chemical flooding: Spectroscopic and calorimetric study of adsorption and precipitation on reservoir minerals. Quarterly technical progress report, July 1, 1994–October 31, 1994, 20:7211 (R;US)
Son, E.K., A study on the briquetting by improving the carbonization, 20:7142 (R;KR;In Korean)
Son, J.E., *See* Son, Y.M., 20:8456
Son, J.I., A Sturdy on Environmemtal Pollution Control in the Energy Field, 20:8457 (R;KR;In Korean)
Son, Y.M., Investigation of technologies for CO_2 separation, fixation and disposal for the prevention of global warming, 20:8456 (R;KR;In Korean)
See Sim, K.S., 20:7535, 20:7569
See Son, J.I., 20:8457
Song, C., *See* Schobert, H.H., 20:7247
Song, Cheol Hwa, *See* Chung, Moon Ki, 20:7686
Song, Hee Seop, *See* Yoo, Jang Ryoel, 20:8603
Song, Hi Sup, *See* Lee, Young Il, 20:8624
Song, Hoon, *See* Cho, Man, 20:7677
Song, Hui Seop, *See* Kim, Jae Rok, 20:8602
Song, In Ho, *See* Kim, Se Chang, 20:7658
Song, Kee Nam, *See* Lee, Jae Kyung, 20:7659
Song, Keun Uh, *See* Sohn, Dong Seong, 20:7704
See Yang, Myeong Seung, 20:7668
Song, Ki Chan, *See* Park, Hyun Soo, 20:7672
Song, Ki Dong, Economic analysis of nuclear power generation, 20:7860 (R;KR;In Korean)
See Choi, Young Myung, 20:9146
Song, Ky Seok, *See* Cha, Hyung Ki, 20:8988
Song, Kyu Seok, *See* Lee, Jong Min, 20:7516, 20:8169, 20:8231
Song, Soon Ja, *See* Ham, Chang Shik, 20:8336
Song, Tae Gil, *See* Chung, Moon Kyu, 20:7655
Song, Woo Seop, *See* Hwang, Churl Kew, 20:9068
Song, Woo Sup, *See* In, Sang Ryul, 20:9107
See Lee, Kwang Won, 20:9106
Soni, A., *See* Bernard, C., 20:8711
Sood, D.D., The role of plutonium in the nuclear power programme of India, 20:7269 (RA;XA)
Soong, S.T., *See* Kim, J., 20:8653
Sorensen, S.N., Outdoor air and groundwater as natural sources for cooling, 20:8000 (RA;US)
Sorokin, A.P., *See* Bogatyrev, I.L., 20:7700
Sotberg, T., Structural reliability methods for pipeline design and code calibration, 20:7245 (R;NO)
Sovinec, C.R., MHD simulations of DC helicity injection for current drive in tokamaks, 20:9046 (R;US)
Sowers, C.H., *See* Mattson, J.E., 20:8071
Spalek, J., *See* Byczuk, K., 20:9029
Spasennykh, M.Yu., *See* Mironenko, M.V., 20:7479
Spatz, T.L., Melter feed tank operating map from the FA-10.02 test data, 20:7434 (R;US)
Spence, B., *See* Au, G., 20:8744
See Manojlovic, N., 20:8740
See Papadopoulos, G., 20:8739
Spence, P.A., *See* Kee, R.J., 20:8108
Spiegelberg, A., *See* Schreiber, G.A., 20:8600
Spinka, H., New results in nucleon-nucleon scattering at intermediate energies, 20:8777 (R;US)
See Fornek, T., 20:8340
Sprung, J.L., *See* Helton, J.C., 20:7820, 20:7821, 20:8509
Srauss, M., *See* Levron, D., 20:8954
Srents, A.K., *See* Belov, A.G., 20:8289
Sresty, G.C., Demonstration testing and evaluation of in situ soil heating. Treatability study work plan (Revision 2), 20:7301 (R;US)

Srinivasan-Rao, T., Lasers for RF guns: Proceedings, 20:8310 (R;US)
Srivastava, P.P., Light-front dynamics of Chern-Simons systems, 20:8721 (R;XA)
Staats, G.E., *See* Carabetta, R.A., 20:7259
Stabnikov, M.V., *See* Ermakov, K.N., 20:8932
Stadler, P.F., Evolution on fitness landscapes, 20:8566 (RA;US)
Stagni, L., *See* Cantoni, P., 20:8377
Stal'gorova, O.V., *See* Smirnov, L.S., 20:9009
Stalzer, R.H., *See* Comolli, A.G., 20:7134
Stamenov, D.B., Once more on the radiative corrections to the nucleon structure functions in QCD, 20:8758 (R;XA)
Stanfors, R., *See* Olsson, Olle, 20:7359
Stansbury, P.S., *See* Johnson, J.R., 20:8631
Starkov, A.N., Around Ratner, 20:8672 (R;XA)
Starodub, G.Ja., *See* Belov, A.G., 20:8291
Stechel, E.B., *See* Markel, V.A., 20:8980
Stefan, P.M., Operation of a small-gap undulator on the NSLS X-ray Ring, 20:8312 (R;US)
Steger, H., *See* Hamann, N., 20:8819
Stehle, B., *See* Arnecke, G., 20:7803
Steimle, T.C., Generation, detection and characterization of gas-phase transition metal aggregates and compounds. Final technical report, September 15, 1991–July 14, 1994, 20:8181 (R;US)
Steinbach, W.C., *See* Boecker, D., 20:7187
Steiner, D., *See* Burtscher, H., 20:8477
Steinfeld, G., *See* Patel, P., 20:7936
Steinhauer, C., *See* Benz, G., 20:7816
Stenberg, J., Simultaneous in-situ measurements of temperature and size of burning char particles in a fluidized bed furnace by means of fiber optic pyrometry, 20:7185 (RA;FI)
Stenholm, M., *See* Jensen, P.A., 20:7558
Stepanovskij, Yu.P., *See* Afanas'ev, G.N., 20:8733
Stevenson, J., Solid oxide fuel cells material research, 20:7920 (RA;US)
Stevenson, J.W., *See* Armstrong, T.R., 20:7922
Steward, C., Ambiguities in strong absorption parametrisations of nuclear scattering data, 20:8939 (R;AU)
Ambiguities in strong absorption S-functions and corresponding potentials for heavy ion collisions, 20:8942 (R;AU)
Stinchcomb, W.W., *See* Curtin, W.A., 20:8143
Stock, L.M., Molecular catalytic coal liquid conversion. Quarterly progress report, 20:7130 (R;US)
Stoltsov, M.V., *See* Gaidarov, M.K., 20:8859
Stoker, A.K., *See* Ferenbaugh, R.W., 20:7477
Stoker, M., *See* Martino, A., 20:8194
Stokes, T.I., Engineering test plan for Tank 241-SY-101 in situ viscometer. Revision 1, 20:7418 (R;US)
See Bussell, J.H., 20:7396
Stotland, A., Development of radiation-sterilized mannitol salt agar dip slide kit, 20:8599 (RA;IL)
Stoughton, R.S., A redundant, 6-DOF parallel manipulator structure with improved workspace and dexterity, 20:8244 (R;US)
Stoyanov, D.Ts., Some functional solutions of the Yang-Baxter equation, 20:8719 (R;XA)
Strand, T., Technical evaluation of a dual-junction same-band-gap amorphous silicon photovoltaic system at NREL, 20:7598 (R;US)
Strasser, J., Results of the validation of the oil heat vent analysis program (OHVAP), 20:7957 (RA;US)
Stratmanns, E., *See* Goeller, B., 20:7801
Stratton, T.J., *See* Millar, J.S., 20:7368
Strel'tsov, V.N., The Radiation Conditioned by the 'Velocity Part' of the Electromagnetic Field of a Moving Charge, 20:8656 (R;XJ)
Strepetov, N.V., *See* Adamov, E.O., 20:7722
Stritar, A., Application of neural networks in nuclear safety analysis, 20:7641 (RA;XA)
Strokovsky, E.A., Experimental Results on Charge Exchange Reactions with Δ Excitations and Polarization Studies of Δ and N* (1440) Resonances, 20:8926 (R;XJ)
Stromatt, R.W., *See* Baldwin, D.L., 20:7346
Stromswold, D.C., CsI(Tl) with photodiodes for identifying subsurface radionuclide contamination, 20:8409 (R;US)
Strongin, M., *See* Jacobsen, F., 20:8415
Strugalska-Gola, E., Observations of Fast Hadron Passages through Intranuclear Matter, 20:8875 (R;XJ)
Strugalski, Z., Mechanisms of High Energy Hadron-Nucleus and Nucleus-Nucleus Collision Processes, 20:8874 (R;XJ)
The Mechanism of Particle Production Process in Hadron-Nucleon Collisions, 20:8797 (R;XJ)
See Strugalska-Gola, E., 20:8875
Struwe, D., Analysis of core disruptive accidents in fast reactors, 20:7792 (RA;DE;In German)
See Sengpiel, W., 20:7815
Stuart, J.M., AFBC co-firing of coal and hospital waste. Quarterly progress report, August 1, 1994–October 31, 1994, 20:7168 (R;US)
AFBC co-firing of coal and hospital waste. Quarterly progress report, May 1, 1994–July 31, 1994, 20:8045 (R;US)
Stubbs, T., *See* Hudson, B., 20:8426, 20:8427
Sturm, D., Drill core investigations from the TMI-2 pressure vessel. Final report, 20:7787 (R;DE;In German, English)
Su Xiguang, *See* Zeng Jishu, 20:7292
Su Zhongdi, Progress on Chinese evaluated nuclear parameter library (CENPL) (II), 20:8843 (RA;CN)
Su Zongdi, *See* Zhou Delin, 20:8894, 20:8895
Su, Z.B., *See* Wu, C.Q., 20:9019
Subbaraman, G., *See* Moos, L.P., 20:7468
Subbarayan, S., *See* Mitchell, G., 20:7148
Sublette, K.L., Microbial reduction of SO_2 and NO_x as a means of by-product recovery/disposal from regenerable processes for the desulfurization of flue gas. Technical progress report, September 11, 1992–December 11, 1992, 20:7155 (R;US)
Subrahmanyam, V., Effective chiral-spin Hamiltonian for odd-numbered coupled Heisenberg chains, 20:9020 (R;XA)
Subramaniam, B., Fischer-Tropsch synthesis in supercritical reaction media. Quarterly progress report, July 1–September 31, 1994, 20:7567 (R;US)
Suckewer, S., Progress in compact soft x-ray lasers and their applications, 20:8275 (R;US)
See Krushelnick, K.M., 20:9084
Sugondo, S., *See* Suripto, A., 20:7762
Suh, Doo Whan, A study on the decommissioning of research reactor, 20:7771 (R;KR;In Korean)
Suh, Kyung Suk, *See* Han, Moon Hee, 20:8620
See Kim, Byung Woo, 20:9142
Sults, B.H., NMR study of nanophase Al/Al-oxide powder and consolidated composites, 20:8136 (R;US)
Suk, Ho Cheon, *See* Chung, Jang Hwan, 20:7670
Sukhorukov, V.V., *See* Pitirimova, N.A., 20:9008
Sun Naihong, *See* Liu Ruizhe, 20:9157
Sun Shiping, *See* Wen Ximent, 20:8152
Sun Yaode, The evaluation of natural cadmium neutron data, 20:8888 (RA;CN)
See Wu Zhihua, 20:8889
Sun Zhengjun, *See* Liang Qichang, 20:8873
Sun Zuxun, *See* Zhuang Youxiang, 20:8902
Sun'ga, Kh., *See* Ivanov, V.G., 20:8321
Sunberg, D.S., *See* Bliss, M., 20:8593
Sung, Ki Ung, *See* Chung, Heung Seok, 20:7517
Sung, Ki Woung, Development on the technology for tritium removal processes (II), 20:8171 (R;KR;In Korean)
Suripto, A., Postirradiation examination of a low enriched U_3Si_2-Al fuel element manufactured and irradiated at Batan, Indonesia, 20:7762 (R;US)
Surovtsev, Yu.S., *See* Krupa, D., 20:8836
Sushkov, V.V., *See* Krasnokutskij, R.N., 20:8369
Suter, G.W. II, Approach and strategy for performing ecological risk assessments for the U.S. Department of Energy's Oak Ridge Reservation: 1994 revision, 20:7473 (R;US)
Toxicological benchmarks for screening potential contaminants of concern for effects on aquatic biota: 1994 Revision, 20:8476 (R;US)
See Sample, B.E., 20:8641
See Will, M.E., 20:8640, 20:8642
Suter, P., Methods for the integral assessment of energy-related problems, 20:7844 (IA;CH)

Suuberg, E.M., A new model of coal-water interaction and relevance for dewatering. Final report, 20:7087 (R;US)
Macromolecular structure analysis and effective liquefaction pretreatment. Quarterly technical progress report, 1 January 1991–31 March 1991, 20:7115 (R;US)
Macromolecular structure analysis and effective liquefaction pretreatment. Quarterly technical progress report, 1 April 1991–30 June 1991, 20:7116 (R;US)
Macromolecular structure analysis and effective liquefaction pretreatment. Quarterly technical progress report, 1 July 1991–30 September 1991, 20:7117 (R;US)
Macromolecular structure analysis and effective liquefaction pretreatment. Annual technical report, [October 1991–December 1991], 20:7118 (R;US)
Macromolecular structure analysis and effective liquefaction pretreatment. Quarterly technical progress report, 1 January 1992–31 March 1992, 20:7119 (R;US)
Macromolecular structure analysis and effective liquefaction pretreatment. Quarterly technical progress report, 1 April 1992–30 June 1992, 20:7120 (R;US)
Macromolecular structure analysis and effective liquefaction pretreatment. Quarterly technical progress report, 1 July 1992–30 September 1992, 20:7121 (R;US)
Macromolecular structure analysis and effective liquefaction pretreatment. Eighth quarterly technical progress report, [October–December 1992], 20:7122 (R;US)
Svitra, Z.V., Distributions of 12 elements on 64 absorbers from simulated Hanford Neutralized Current Acid Waste (NCAW), 20:7323 (R;US)
See Marsh, S.F., 20:7478
Swain, S., Probe transparency in a two-level medium embedded by a squeezed vacuum, 20:8956 (R;XA)
Swan, R.A., High temperature probe, 20:8411 (PA;US)
Swansiger, R.W., *See* Simpson, R.L., 20:8111
Swanson, D., *See* Koca, R., 20:8019
Swartz, K.L., Adventures in the evolution of a high-bandwidth network for central servers, 20:9187 (R;US)
Sweeney, M.D., *See* Johnson, V.G., 20:7455
Swensrud, R.L., *See* McLaughlin, D.F., 20:7422
Swietlik, C., *See* Kero, R., 20:9188
Swiler, T.P., Mass transport through polycrystalline microstructures, 20:8107 (R;US)
Szabo, S., *See* Nemec, V., 20:9165
Szczesniak, J., *See* Kosmowski, K.T., 20:7642
Szichman, H., Three-dimensional study of reactive diatom-diatom system. Quantum mechanical state-to-state cross sections for the H_2+OX->H+OX: X=H,D reactions, 20:8962 (RA;IL)
Szymurski, S.R., Materials compatibility and lubricants research on CFC-refrigerant substitutes. Quarterly MCLR program technical progress report, 1 July 1994–30 September 1994, 20:8432 (R;US)

T

Taborek, J., *See* Rabas, T.J., 20:7627
Tae, C.S., A study on energy conservation in heat source distribution system(II), 20:7974 (R;KR;In Korean)
See Seo, H.S., 20:7975
Tal, N., *See* Ankry, N., 20:8351, 20:8352, 20:8353
Talvard, M., Role of MHD activity in LH-assisted discharges in the PBX-M tokamak, 20:9083 (R;US)
Tanabe, F., Critical methodological issues in evaluation of operator support systems, 20:7737 (RA;XA)
Tanaka, S., *See* Raffray, A.R., 20:7675
Tandia, A.A., Estimation of effective recharge of aquifers under semi-arid conditions: Example in North Senegal, 20:8479 (RA;XA;In French)
See Faye, A., 20:8485
Tandy, P.C., *See* Frank, M.R., 20:8826
Tang Guoyou, Evaluation of neutron nuclear data of natural calcium for CENDL-2, 20:8885 (RA;CN)
Revision on recommended data of ^{238}U for CENDL-2, 20:8904 (RA;CN)
Tang Wei, *See* Wang Shuyu, 20:8596
Tang, Y., Rocking response of tanks containing two liquids, 20:8223 (R;US)
Sloshing response of nonuniform density liquid in a laterally excited tank, 20:8224 (R;US)
Tang, Yong N., *See* Smith, J.D., 20:8311
Tannenbaum, M.J., Negative binomial fits to multiplicity distributions from central collisions of ^{16}O + Cu at 14.6A GeV/c and intermittency, 20:8880 (R;US)
Tanzman, E.A., Facility agreements under the chemical weapons convention inspections, 20:8418 (R;US)
Fourth and Fifth Amendment issues raised by Chemical Weapons Convention inspections, 20:8066 (R;US)
Legal aspects of national implementation of the Chemical Weapons Convention, 20:8067 (R;US)
Tarantin, N.I., Cross section of the californium 249 photofission, 20:8919 (IA;RU;In Russian)
Taratin, A.M., Computer Simulation of Accelerator Beam Extraction with a Bent Crystal, 20:8323 (R;XJ)
Tardy, H.L., *See* Gee, J.M., 20:7591, 20:7592
Tarkovskij, P., *See* Bojko, E.B., 20:8089
Tashlykov, I.S., Analysis of the composition of ion-beam irradiated elastomer using the Rutherford back scattering, 20:8166 (IA;RU;In Russian)
Layer-by-layer analysis of chemical composition at the interface of Fe-Pd structure irradiated with Xe^+ ions, 20:8093 (IA;RU;In Russian)
Tashlykova, I.I., *See* Tashlykov, I.S., 20:8166
Tasneem, M.A., *See* Sajjad, M.I., 20:8174
Tatar, J.J., Squeezing out all the performance: Using Ingres for a C^3I reporting system, 20:8417 (R;US)
Tavas-soli, M.K., *See* Sarbishe-ee, M., 20:8729
Tavkhelidze, A.N., Color, Colored Quarks, Quantum Chromodynamics, 20:8767 (R;XJ)
Taylor, P.A., *See* Coroneos, A.C., 20:7335
Taylor, W.R., *See* Hatrick, K., 20:8556
Taylor, Z.T., Description of electric energy use in commercial buildings in the Pacific Northwest: 1992 Supplement. End-use Load and Consumer Assessment Program (ELCAP), 20:8018 (R;US)
See Klevgard, L.A., 20:8007
Teel, S.S., *See* Lewis, R.E., 20:7340
Teese, G.D., *See* Dudar, A.M., 20:8241
Teich, F., *See* Herrmann, G.H., 20:7991
Teiltsin, V.B., *See* Dmitriev, V.F., 20:8848, 20:8849
Tennal, K.B., *See* Mazumder, M.K., 20:7099
Terrell, A.S., *See* McCabe, D.J., 20:7433
Teryaev, O.V., *See* Bratkovskaya, E.L., 20:8801
See Korotkiyan, V.M., 20:8762
Tester, J.W., Environmental impacts of ocean disposal of CO_2. First quarterly report, September 1–September 30, 1994, 20:7856 (R;US)
See Diaz, A.F., 20:7248
Tetasawa, T., *See* Kuzin, A., 20:8940
Teterev, Yu.G., Hydrogen content determination in alkali metals, 20:8168 (IA;RU;In Russian)
See Baatarkhuu, D., 20:8292
Thackeray, M.M., Lithiated oxides for lithium-ion batteries, 20:7828 (R;US)
Transition metal oxides for rocking-chair cells, 20:7829 (R;US)
Thapa, B.B., Analysis of in-situ rock joint strength using digital borehole scanner images, 20:8651 (R;US)
Thoman, J.W., *See* Paul, P.H., 20:8963
Thomas, C., Thirty-Year Solid Waste Generation Forecast by Treatability Group, 20:7461 (R;US)
Thomas, H., *See* Witt, C.E., 20:7596
Thomas, L.C., Thirty-Year Solid Waste Generation Maximum and Minimum Forecast for SRS, 20:7462 (R;US)
Thomasson, E., *See* Chugh, Y.P., 20:7153
Thompson, M.N., *See* Kuzin, A., 20:8940
Thomson, T.A., *See* Rockey, J.M., 20:7108
Thorne, P.D., Three-dimensional conceptual model for the Hanford Site unconfined aquifer system: FY 1994 status report, 20:8512 (R;US)

Thresher, R.W., Wind technology development: Large and small turbines, 20:7620 (R;US)
Thurnay, K., *See* Arnecke, G., 20:7803
Tiapchenko, Y.A., Generic information display system for the control centre of the nuclear power station power unit, 20:7723 (RA;XA)
Tierney, J.W., *See* Wender, I., 20:7128
Tigges, C.P., *See* Zolper, J.C., 20:7593
Tighe, W., *See* Krushelnick, K.M., 20:9084
Till, E., Calculation of the radiation transport in rock salt using Monte Carlo methods. Final report. HAW project, 20:7314 (R;DE)
Timcak, G.M., *See* Nemec, V., 20:9165
Ting, A., *See* Kee, R.J., 20:8108
Ting, M.K., *See* Liu Zhiping, 20:8027
Tingey, J.M., Characterization of Hanford tank wastes containing ferrocyanides, 20:7345 (R;US)
See Pool, K.N., 20:7398
Tinggaard Svendsen, G., CO_2 taxation in the EU, 20:7846 (I;DK)
Tirosh, D., *See* Burstein, O., 20:8357
See Mazor, T., 20:8354
See Paran, J., 20:8360, 20:8366
See Wengrowicz, U., 20:8359
Titov, A.I., *See* Kotov, A.V., 20:8092
Titov, P.A., *See* Bogatyrev, I.L., 20:7700
Tiwary, S.N., Inner- and outer-shell excitation in lithium isoelectronic sequence, 20:8952 (R;XA)
Tochenij, L.V., *See* Orlov, V.V., 20:7355
Todd, L.J., *See* McCabe, D.J., 20:7433
Todt, V.R., Processing of single- and multi-domain $YBa_2Cu_3O_x$ bulk materials for levitation applications by $Nd_{1+x}Ba_{2-x}Cu_3O_y$ seeding, 20:8118 (R;US)
Toffer, H., *See* Finfrock, S.H., 20:7367
Toki, W.H., *See* Lee, S.A., 20:8754
Tomy, C.V., Neutron diffraction from $HoNi_2B_2C$. Version 1, 20:8982 (R;US)
Tonchev, A.P., *See* Belov, A.G., 20:8923
See Gangrskij, Yu.P., 20:8922
See Kondev, F.G., 20:8917, 20:8920
Tong Guoyou, *See* Liang qichang, 20:8891
Tonkovich, A.L.Y., A simulated countercurrent moving-bed chromatographic reactor for the oxidative coupling of methane: Experimental results, 20:7571 (R;US)
Toquam, J., *See* Montgomery, J.C., 20:7752
Toran, L.E., *See* West, O.R., 20:7451
Torrero, M.E., *See* Grambow, B., 20:8126
Traberg, R., Contaminant transport at a waste incinerator residue deposit. 2D hydrogeochemical modelling, 20:8507 (RA;DK)
Traenkner, T., EVOPE - Evaluation of polyethylene pipes for gas distribution. Final report, 20:7256 (R;SE;In Swedish)
Tramer, M., *See* Elias, E., 20:7747
Trautmann, N., *See* Yushkevich, Yu.V., 20:8324
Travelli, A., *See* Bretscher, M.M., 20:7763
Travi, Y., *See* Faye, A., 20:8485
Trebino, R.P., *See* Kane, D.J., 20:8271
Trefethen, L.N., Linear non-modal phenomena in numerical analysis and applied mathematics. First annual performance report, February 15, 1994–November 15, 1994, 20:9162 (R;US)
Trefilk, L., TIS process supervisory local area network (LAN), 20:7711 (RA;XA)
Tret'yakova, S.P., *See* Lazarev, Yu.A., 20:8931
Trewin, R.R., Enhanced boiling heat transfer in horizontal test bundles, 20:8022 (R;US)
Trifunac, A.D., *See* Shkrob, I.A., 20:8197
Trimble, D.J., Sealed canister liquid sampling for fuel characterization shipments, 20:8636 (R;US)
Tromm, W., *See* Alsmeyer, H., 20:7807
Trout, R., *See* Hoskin, D., 20:7955
Troyer, G.L., *See* Kangas, L.J., 20:7453
Trugman, S.A., Complex scattering dynamics and the quantum Hall effects, 20:8681 (R;US)
Trutko, M.A., *See* Gaitinov, A.Sh., 20:8924
Tsai, Yung Su, Production of polarized τ pairs and tests of CP violation using polarized $e^{\pm}$ colliders near threshold, 20:8738 (R;US)
Tsang, Kh., *See* Krasnokutskij, R.N., 20:8369
Tsidulko, Yu.A., Removal of impurity ions from a magnetic trap with a two-component plasma on their collision with fast component ions, 20:9055 (R;RU;In Russian)
Tsotsis, T.T., Hindered diffusion of coal liquids. Quarterly report No. 8, June 18, 1994–September 17, 1994, 20:7136 (R;US)
Tsvetkov, I.O., Background Event Discrimination in Neutron Time-of-Fight Measurements at Beams of Relativistic Nuclei of the JINR synchrotron, 20:8381 (R;XJ;In Russian)
Tuan Tran, A., *See* Hoang Ngoc Long, 20:8757
Tuck, M.R., *See* Adkins, D.R., 20:8257
See Shen, D.S., 20:8279
Tuerkcan, E., On-line operator support system integrated with monitoring and diagnosis system, 20:7714 (RA;XA)
Tuozzolo, J., *See* Alessi, J.G., 20:8283
Turchi, C., *See* Mehos, M., 20:8463
See Nimlos, M.R., 20:8462
Turek, E., *See* Gillham, T., 20:7219
Turiel, I., Evaluation of advanced technologies for residential appliances and residential and commercial lighting, 20:7982 (R;US)
Turkcan, E., Enhancement of verification and validation for nuclear reactors through artificial intelligence, 20:7736 (RA;XA)
Turman, B.N., Feasibility of ceramic joining with high energy electron beams, 20:8130 (R;US)
Turner, W.C., *See* Jacobsen, F., 20:8415
Turrero, M.J., *See* Gomez, P., 20:8474
Tuson, G.B., Oxygen enriched combustion system performance study. Phase 2: 100 percent oxygen enriched combustion in regenerative glass melters, Final report, 20:8023 (R;US)
Tutu, N.K., Experimental evaluation of mercury release from molten lead, 20:8638 (R;US)
Tyler, S., *See* Albright, W., 20:7443
Tyschenko, I.E., *See* Kachurin, G.A., 20:9000
Tzabarim, M., *See* Baran, A., 20:8588

U

Uglov, V.V., Modification of high-chromium die steel by ion alloying, 20:8096 (IA;RU;In Russian)
Uh, Jong Seop, *See* Kim, Jae Rok, 20:8602
Uh, Moon Sik, *See* Park, Jin Ho, 20:8621
Ukhov, V.I., Algorithm for model-based diagnosis of the beam line, 20:8314 (R;RU;In Russian)
See Klimenko, S.V., 20:9164
Ul'yanov, Yu.N., *See* Saldin, E.L., 20:8322, 20:9105
Ulibarri, C.A., Tax revenue and innovations in natural gas supply: New Mexico, 20:7251 (R;US)
Ullmaier, H., Some information and remarks concerning plans to build a European spallation source for neutron scattering application, 20:7530 (IA;DE)
Umatov, V.I., *See* Barabash, A.S., 20:8870
Underwood, D., *See* Fornek, T., 20:8340
Underwood, D.G., A review of high energy polarimetry, with a view toward RHIC, 20:8338 (R;US)
The STAR EM calorimeter design and small prototype test results, 20:8339 (R;US)
Unzeitig, M., Current effects of environmental provisions during uranium mining in the Ceska Lipa district, 20:7447 (IA;CZ;In Czech)
Uprety, K.K., A simple model for the dc flux transformer in layered superconductors with Josephson coupling, 20:9034 (R;XA)
Urban, M., Intensity dependence of the third harmonic generation efficiency for high power far infrared radiation in n-silicon, 20:9075 (R;CH)
Urmanov, A.R., Effect of high energy ions on radiation-induced defects in crystals, 20:8999 (IA;RU;In Russian)
Usmanov, P.N., The properties of Low-Lying States of ^{166} Er, 20:8865 (R;XJ;In Russian)
See Mikhajlov, I.N., 20:8864
Usubov, Z.U., *See* Aliev, R.M., 20:8925
Utenkov, V.K., *See* Lazarev, Yu.A., 20:8931
Uzochukwu, G.A., Infrastructure support for the Waste Management Institute at North Carolina A&T State University. Progress report, September 1994–January 1995, 20:7307 (R;US)

V

Vaeth, L., *See* Arnecke, G., 20:7803
Vagish, Z., *See* Liepmann, M.J., 20:8402
Valdes, M. J., Influence of recD1013 and recJ284 mutations of Escherichia coli on indirect recombinogenesis of lambda phage., 20:8614 (I;MX;In Spanish)
Valencia A, R., Power oscillator in the Tokamaks training., 20:9053 (I;MX;In Spanish)
Study of the Reflex-Klystron., 20:8317 (I;MX;In Spanish)
Valencia, G., *See* Dawson, S., 20:8753
See Hamann, N., 20:8819
Valmari, S.T., Continuous method for coal fired power plant particle emission mass monitoring, 20:7637 (RA;FI)
Van Der Beck, R.R., Electrical insulator assembly with oxygen permeation barrier, 20:7680 (PA;US)
Van Dyke, G.D., Pipeline corridors through wetlands - impact on plant communities: Mill Creek Tributary Crossing, Jefferson County, New York, 1991 survey. Topical report, June 1991–April 1993, 20:7252 (R;US)
See Shem, L.M., 20:7253, 20:7254
Van Kirk, C.W., Interdisciplinary study of reservoir compartments. Quarterly technical progress report, July 1, 1994–September 30, 1994, 20:7212 (R;US)
Van Ryn, F., *See* Whitehouse, J.C., 20:7432
Van Tuyle, G.J., *See* Tutu, N.K., 20:8638
Vance, R.F., Slanted baffle mist eliminator, 20:7337 (PA;US)
Vandegrift, G.F., *See* Leonard, R.A., 20:7289
VanKuiken, J.C., APEX user's guide - (Argonne production, expansion, and exchange model for electrical systems), version 3.0, 20:7904 (R;US)
Varacalle, D.J. Jr., Method of fabricating silicon carbide coatings on graphite surfaces, 20:8129 (PA;US)
Varma, H.K., *See* Warrier, K.G.K., 20:8116
Vaudin, A., *See* Jenkins, N., 20:7619
Vawter, G.A., *See* Kravitz, S.H., 20:8277
Vazquez A, O., *See* Arzate O, O., 20:8205
See Moreno A, J., 20:8208
Vdovin, A.I., Extension of the QPM to $T \neq 0$ Based on the Formalism of the Thermo Field Dynamics, 20:8861 (R;XJ)
Vecheslavov, V.V., Instability of weakly nonlinear chaotic structures, 20:8687 (R;RU)
Vega G, M.G., Evaluation of recurrent radiation with Cobalt 60 gamma rays on agronomic traits of barley (Hordeum Vulgare L.) in the R_2M_1 generation., 20:8615 (I;MX;In Spanish)
Vegh, E., *See* Adorjan, F., 20:7713
See Gyenes, G., 20:7734
Veletsos, A.S., Dynamic modeling and response of rigid embedded cylinders, 20:8225 (R;US)
Velsko, S.P., *See* Barker, C.E., 20:8273
Ventura, S., *See* Bhown, A.S., 20:7635
Vermeul, V.R., *See* Thorne, P.D., 20:8512
Verrall, R.A., *See* Slagle, O.D., 20:9124
Vershinin, G.A., *See* Poleshchenko, K.N., 20:8123
Vertes, P., *See* Gyenes, G., 20:7734
Vesala, T., A model for gas exchange through stomata, 20:8438 (RA;FI)
See Korhonen, P., 20:8442
Veselka, T.D., *See* VanKuiken, J.C., 20:7904
Veselov, G.V., The Method of Decay Energy Determination for Short-Lived Nuclei in On-Line Experiments, 20:8382 (R;XJ;In Russian)
Vesztergombi, G., *See* Bogdany, J., 20:9173
See Rohrbach, F., 20:9174
Veyo, S.E., SOFC development for logistics fuel applications, 20:7937 (RA;US)
Tubular solid oxide fuel cell demonstration activities, 20:7919 (RA;US)
Vick, J.D., Stakeholder involvement report for the Cryocell® demonstration at Hanford, 20:7864 (R;US)
Vickers, T.J., *See* Mann, C.K., 20:8178
Victoria, M., *See* Levinson, J., 20:8404
Vikram, C.S., *See* Pechersky, M.J., 20:7697
Villavicencio, A.L.C.H., *See* Del Mastro, N.L., 20:8207
Vincent, P., Measurement of the semi-leptonic branching ratio and the baryonic contribution in b quark disintegrations, 20:8837 (R;FR;In French)
Virkar, A., *See* Hollenberg, G.W., 20:7347
Virkkula, A., *See* Pakkanen, T., 20:8445
Vitus, C.M., A study of the electrochemical behavior in tungsten and caustic solutions and platinum/iridium in chloride solutions, informal report, 20:8072 (R;US)
Vogt, J., *See* Wehner, S., 20:7224
Vogt, P.J., *See* Baskett, R.L., 20:8645
Vol'f, G., *See* Tashlykov, I.S., 20:8093
Void, E.L., A brief review of environmental transport of tritium at the Los Alamos LLRW disposal facility, 20:8498 (R;US)
Volkas, R.R., Possible reason why leptons are lighter than quarks, 20:8842 (R;AU)
See Choi, J., 20:8771
See Lassig, C.C., 20:8775
See Shaw, D.S., 20:8772
Volodin, V.D., *See* Aksinenko, V.D., 20:8387
Vologdin, Eh.N., *See* Ehmeksuzyan, V.M., 20:8094
Volosov, V.I., Energy spectra of charge-exchange atoms from a rotating plasma, 20:9067 (R;RU;In Russian)
von Geramb, H.V., *See* Katsogiannis, A., 20:8821
von Goeler, S., *See* Hill, K.W., 20:9082
See Talvard, M., 20:9083
Vook, F.L., Physical and Chemical Sciences Center: Research briefs. Volume 9-94, 20:7880 (R;US)
Vorozhtsov, S.B., Parameters Calculation of Three Stage TRITRON-Type Accelerator, 20:8280 (R;XJ;In Russian)
Vreden, N., *See* Schreiber, G.A., 20:8601
Vulaski, E., *See* Ankry, N., 20:8352
See Ellenbogen, M., 20:8356
See Mazor, T., 20:8354
Vulasky, E., *See* Ankry, N., 20:8351

W

Wach, D., Experience and benefits with diagnostic systems in German PWRs, 20:7712 (RA;XA)
Wacholder, E., *See* Elias, E., 20:7747
Wagener, R., *See* Schwartz, S.E., 20:8431
Wagner, D.G., *See* Dudar, A.M., 20:8241
Wagner, J.L., *See* Zasadzinski, J., 20:8117
Wagner, K.E., *See* Beddies, H., 20:8036
Wagner, U., *See* Schreiber, G.A., 20:8601
Wagner, V., *See* Adam, J., 20:8384
Wahlroos, H., Toms Creek Integrated Gasification Combined Cycle Demonstration Project. Quarterly progress report, July 1, 1994–September 30, 1994, 20:7106 (R;US)
Walcek, C.J., Use of cloud observations and mesoscale meteorology models to evaluate and improve cloud parameterizations. Technical progress report, 1 October 1993–30 December 1994, 20:8433 (R;US)
Walker, M.A., *See* Payne, J.L., 20:8258
Wallen, B., Corrosion testing of three highly alloyed stainless steels in hot chlorinated seawater, 20:8110 (R;SE;In Swedish)
Wallen, V., Combustion experiments of fuel gases in atmospheric fluidized bed combustor test rig, 20:7186 (R;FI)
Walsh, P.M., *See* Schobert, H.H., 20:7247
Walter, K.C., Characterization and performance of carbon films deposited by plasma and ion beam based techniques, 20:9012 (R;US)
Wan Yude, Study on the large position sensitive detector, 20:8343 (R;CN;In Chinese)
Wang Cuilan, *See* Zhou Delin, 20:8893, 20:8894, 20:8895
Wang Guanghou, *See* Luo Chenglin, 20:9028
Wang Haiming, *See* Wang Yansen, 20:8899
Wang Hui, *See* Wang Shuyu, 20:8596
Wang Lianxiang, *See* Qian Mingsen, 20:7580, 20:7581
Wang Quanming, *See* Luo Cuixian, 20:9043
Wang Shunuan, Review and evaluation of fission barrier properties research, 20:8901 (RA;CN)

Wang Shuyu, Syntheses of nucleic acid and protein in somatic embryos of Fritillaria ussuriensis maxim in different development stages, 20:8596 (R;CN)
Wang Xiangying, *See* Wang Xiuzhen, 20:8610
Wang Xiuzhen, Pathology study of radiation injury in the rat testes, 20:8610 (R;CN;In Chinese)
Wang Yansen, A theoretical calculation of n-T scattering cross sections, 20:8899 (RA;CN)
Wang Yuanchang, *See* Wang Xiuzhen, 20:8610
Wang Zisheng, *See* Cai Dunjiu, 20:8892
Wang, J., Phonon-induced anomalous specific heat of a model nanocrystal by computer simulation, 20:8971 (R;US)
Wang, J.W., High gradient tests of SLAC Linear Collider Accelerator Structures, 20:8328 (R;US)
Wang, L.M., *See* Weber, W.J., 20:8144
Wang, M.Q., Methods of valuing air pollution and estimated monetary values of air pollutants in various U.S. regions, 20:7849 (R;US)
Wang, O.S., High-heat tank safety issue resolution program plan. Revision 2, 20:7489 (R;US)
Wang, X., Ultrafast, high precision gated integrator, 20:8269 (R;US)
Wang, Xijie, *See* Qiu, Xu Z., 20:8299
Wannaes, K.O., Tectonic framework of the Hanoe Bay area, southern Baltic Sea, 20:8514 (R;SE)
Wanner, H., Project Caesium - An ion exchange model for the prediction of distribution coefficients of caesium in bentonite, 20:8195 (R;SE)
Ward, D.J., Wall stabilization of ideal modes in tokamaks, 20:9074 (RA;CH)
Warinner, S.A., *See* Wang, M.Q., 20:7849
Warren, J.L., Lightweight extendable and retractable pole, 20:8243 (PA;US)
Warrier, K.G.K., Zone refining of sintered, microwave-derived YBCO superconductors, 20:8116 (R;US)
Wasan, D.T., Surfactant-enhanced alkaline flooding for light oil recovery. Quarterly report, April 1–June 30, 1994, 20:7208 (R;US)
Surfactant-enhanced alkaline flooding for light oil recovery. Quarterly report, July 1–September 30, 1994, 20:7209 (R;US)
Waters, E.D., *See* Wong, J.J., 20:7412
Watkins, D.R., FY 1995 Remedial Investigation Work Plan for Waste Area Grouping 2 at Oak Ridge National Laboratory, Oak Ridge, Tennessee, 20:7298 (R;US)
Watson, R.W., An experimental and theoretical study to relate uncommon rock/fluid properties to oil recovery. Quarterly report, July 1, 1993–September 30, 1993, 20:7189 (R;US)
An experimental and theoretical study to relate uncommon rock/fluid properties to oil recovery. Quarterly report, October 1, 1993–December 31, 1993, 20:7190 (R;US)
See Adewumi, M.A., 20:7239
Watson, W.T., *See* Finfrock, S.H., 20:7367
Watt, A.J., *See* Gurarie, V.N., 20:8132
Watt, A.S., *See* Nimlos, M.R., 20:8462
Watts, J.A., *See* Clapp, R.B., 20:7471
Webb, B.W., *See* Queiroz, M., 20:7173
Weber, K.E., *See* Kaushal, T.S., 20:8056
Weber, W.J., Temperature and dose dependence of metal colloid production in alpha-irradiated CaF_2, 20:8144 (R;US)
Webster, I.A., *See* Tsotsis, T.T., 20:7136
Weghaus, M., Sewage sludge pyrolysis/conversion: disposal of sewage sludge with the production of oils. Final report, 20:8046 (R;DE;In German)
Wehner, S., CO_2 Huff-n-Puff process in a light oil shallow shelf carbonate reservoir. Quarterly technical progress report, 3rd quarter, 1994, 20:7224 (R;US)
Wei Peng, A generic data exchange scheme between FITS format and C structures, 20:8690 (R;US)
Wei, D., *See* Osseo-Asare, K., 20:7145
Wellenmann, U., Insurable risk associated to climate change, 20:7865 (RA;CH)
Weinberg, A., Field study of circulating fluidized-bed ash. Final report, April 1986–October 1994, 20:7151 (R;US)
Weinberg, D., *See* Hoffmann, H., 20:7791
Weininger, J., ^{99m}Tc-Teboroxime as an alternative to ^{201}Thalium for myocardial perfusion imaging. Preliminary study, 20:8587 (RA;IL)
Weinstein, M., *See* Levinson, S., 20:8362
See Pelled, O., 20:8361
Weiser, P., *See* Gurarie, V.N., 20:8134
Weiser, P.S., *See* Prawer, S., 20:9014
Weiss, W.W., *See* Buckley, J.S., 20:7191
Weissenfels, R.D., Operability test procedure for the TK-900 effluent monitoring station, 20:7406 (R;US)
Welch, D.O., The real structure of columnar pinning centers in heavy-ion-irradiated cuprate superconductors, 20:8119 (R;US)
Welch, M.J., *See* Arendt, J.W., 20:7282
Welsby, P., *See* Chapman, J.F., 20:7995
Wen Ximent, Determination of micro-amount carbon in sodium metal by vacuum distillation-gas chromatography, 20:8152 (R;CN;In Chinese)
Wendelin, T.J., Comparison of three methods for optical characterization of point-focus concentrators, 20:7599 (R;US)
Wender, I., Effect of pretreating of host oil on coprocessing. Quarterly progress report, July 1–September 30, 1994, 20:7128 (R;US)
Wender, S.A., *See* Nelson, R.O., 20:8937, 20:8938
Wendt, K., *See* Yushkevich, Yu.V., 20:8324
Wengroeicz, U., *See* Burstein, O., 20:8357
Wengrowicz, U., Alpha and beta radioactivity contamination counting system, 20:8359 (RA;IL)
See Mazor, T., 20:8354, 20:8355
Werle, H., *See* Alsmeyer, H., 20:7797
See Fieg, G., 20:7806
Werner, H.J., *See* Baer, M., 20:8185
Wescott, J.B., *See* Moos, L.P., 20:7468
Wesnor, J.D., Air toxics evaluation of ABB Combustion Engineering Low-Emission Boiler Systems, 20:7174 (R;US)
Wessler, S., Molecular characterization of a maize regulatory gene. Progress report, July 1989–March 1990, 20:8579 (R;US)
Molecular characterization of a maize regulatory gene. Final Progress report, November 1992–March 14, 1994, 20:8580 (R;US)
West, M.H., Thermodynamic modeling of hydrogen fluoride production relevant to actinide residue treatment, 20:7263 (R;US)
West, O.R., Development of a three-dimensional groundwater flow model for Western Melton Valley: Application of P-FEM on a DOE waste site, 20:7451 (R;US)
Westborg, S., Analysis of straw and straw ashes. Part 1. Recommended methods for basic parameters, 20:7553 (R;DK)
Analysis of straw and straw ashes. Part 2. Basic parameters which demands further investigation of suitable analytical methods, 20:7554 (R;DK)
Analysis of straw and straw ashes. Part 3. Alternative characterization methods, 20:7555 (R;DK)
Analysis of straw and straw ashes. Part 4. Research and development countries concerning analysis and characterization of biomass fuels. State of the art, 20:7556 (R;DK)
Analysis of straw and straw ashes. Compilation of comments received. Part 1-4, 20:7557 (R;DK)
Westby, R., *See* Carlisle, N., 20:7586
Westenskow, G., *See* Li, H., 20:8304
Wheatcraft, D., *See* Bookless, W.A., 20:9129
Whitaker, M.J., *See* Wicks, G.G., 20:8172
White, A.R., *See* Coriano, C., 20:8709
White, E.L., Search Hanford accessible reports electronically system configuration management plan, 20:7287 (R;US)
White, J., *See* Lopez, A., 20:7107
White, J.E., *See* Ingersoll, D.T., 20:7648
White, M., *See* Qian, Y.L, 20:8261
Whitehead, D.W., Risk contribution from low power, shutdown, and other operational modes beyond full power, 20:7650 (R;US)
Whitehouse, J.C., Development of a Transportable Vitrification System for Mixed Waste, 20:7432 (R;US)
Whitlock, R.W., Leachate storage transport tanker loadout piping, 20:7382 (R;US)
Whitman, D.J., *See* Chapman, J.F., 20:7995
Whitney, K., *See* Bourn, G., 20:8064
Whittington, K.F., *See* Merrill, R.A., 20:7350
Wicks, G.G., Tetraethyl orthosilicate-based glass composition and method, 20:8172 (PA;US)
Widen, H., Performance of the SKB copper/steel canister, 20:7361 (R;SE)

Wieland, E., *See* Wanner, H., 20:8195
Wielopolski, L., *See* Alessi, J.G., 20:8283
Wiess, A., *See* Jacobsen, F., 20:8415
Wiezorek, C., *See* Schreiber, G.A., 20:8601
Wiffen, F.W., The role of intense neutron sources and other irradiation facilities in materials development for fusion, 20:9117 (IA;DE)
U.S. strategy for the development of fusion reactors, 20:9110 (IA;DE)
Wikberg, P., *See* Olsson, Olle, 20:7359
Wilbanks, W.L., *See* Ruby, D.S., 20:7588
Wilhelm, D., *See* Hoffmann, H., 20:7791
Wilhelmsson, B., An experimental and theoretical study of multicylinder paper drying, 20:8028 (R;SE)
Wiliams, J.S., *See* Gurarie, V.N., 20:8132
Willkens, M., *See* Scheer, S., 20:7740
Wilken, D.E., *See* Suits, B.H., 20:8136
Wilkes, G.L., *See* Martinez-Pardo, M.E., 20:8209
Will, H., *See* Huber, F., 20:7800
Will, M.E., Toxicological benchmarks for screening potential contaminants of concern for effects on terrestrial plants: 1994 revision, 20:8640 (R;US)
Toxicological benchmarks for screening potential contaminants of concern for effects on soil and litter invertebrates and heterotrophic process, 20:8642 (R;US)
Wille, E., What is the actual diffusion of pollutants through the earth surface/cellar floor? Can flux-chamber measurements give an answer?, 20:8503 (RA;DK;In Danish)
Willhite, G.P., *See* Green, D.W., 20:7207
Williams, B.A., *See* Fairbrother, A., 20:7866
Williams, D.C., The left-right forward-backward asymmetry of heavy quarks measured with jet charge and with leptons at the SLD, 20:8815 (R;US)
Williams, D.F., *See* Brunson, R.R., 20:7334
Williams, G.P., *See* Reffner, J.A., 20:8981
Williams, H.H., Top quark kinematics and mass determination, 20:8828 (R;US)
Williams, H.R., *See* Katipamula, S., 20:7600
Williams, R.S., *See* Anz, S.J., 20:8176
Williams, T., *See* Mehos, M., 20:8463
Williamson, T.G., Nuclear criticality safety evaluation – DWPF Late Wash Facility, Salt Process Cell and Chemical Process Cell, 20:8227 (R;US)
Wilson, R.B., *See* Hirschon, A.S., 20:7124
Wind, J., *See* Ohlrogge, K., 20:7244
Winnick, J., High temperature electrochemical separation of H_2S from coal gasification process streams. Quarterly progress report, July 1, 1994–September 30, 1994, 20:7132 (R;US)
High temperature elkectrochemical polishing of H_2S from coal gasification process streams. Quarterly progress report, August 1, 1994–September 30, 1994, 20:7139 (R;US)
Winschel, R.A., *See* Robbins, G.A., 20:7138
Winter, C.J., World energy scenarios: the two-kilowatt-society, a plausible future or an illusion, 20:7839 (IA;CH)
Winter, F., *See* Baxter, L., 20:7560
Winters, N., *See* Beary, M.M., 20:7343, 20:7344
Winters, W.I., Sample Exchange Evaluation (SEE) Report - Phase II, 20:7414 (R;US)
See Baldwin, D.L., 20:7346
Wiser, W.H., Novel process for depolymerization of coal to C_2-C_4 hydrocarbons. Final report, 1 September 1989–31 August 1993, 20:7111 (R;US)
Wislicki, W., *See* Gaitinov, A.Sh., 20:8924
Witt, C.E., Recent progress in the Photovoltaic Manufacturing Technology Project (PVMaT), 20:7596 (R;US)
Witte, N.S., Plaquette expansion proof and interpretation, 20:8741 (R;AU)
See Feng, Xiaoping, 20:8957
See Hollenberg, L.C.L., 20:8742
Woerner, G., *See* Huber, R., 20:7802
Woerz, R., *See* Schwarz, J., 20:7996
Wojcik, W., *See* Byczuk, K., 20:9029
Wokaun, A., The energy storage program of PSI, 20:7825 (IA;CH)
Wolf, A., Evidence foe phase transitional behavior of even-even nuclei from differential observables, 20:8855 (RA;IL)
F-SPIN PURITY OF 2^+_1 states in even-even nuclei, 20:8857 (RA;IL)
g-Factor of the $3/2^+$ 93.6 keV level of ^{91}Sr, 20:8856 (RA;IL)
Wolf, D., *See* Wang, J., 20:8971
Wolff, E.A., Studies on control of integrated plants, 20:8031 (R;NO)
Wolfrum, E.J., *See* Nimlos, M.R., 20:8462
Woller, N., Reactive liquid/liquid extraction of heavy metals from landfill seepage waters. Its characterisation and application, 20:8542 (R;DE;In German)
Woloschak, G.E., *See* Paunesku, T., 20:8572
Wolters, J., A three-bar model for ratcheting of fusion reactor first wall, 20:9094 (R;US)
Won, Dong Yeon, *See* Hong, Gyee Won, 20:9038
Won, Jong Yeol, *See* Lee, Han Young, 20:9199
Won, S.H., *See* Kang, Y.H., 20:7968
See Lim, S.H., 20:7972
Won, Soon Yeon, *See* Chung, Moon Ki, 20:7686
Won, Soon Yeun, *See* Cha, Jong Hee, 20:7690
Wong, C.C., A domain decomposition study of massively parallel computing in compressible gas dynamics, 20:8255 (R;US)
Implementation of a parallel algorithm for thermo-chemical nonequilibrium flow simulations, 20:8256 (R;US)
Wong, J.J., Evaluation of AY/AZ tank farm ventilation system during aging waste retrieval operations, 20:7412 (R;US)
Woo, Jong Seop, *See* Lee, Ji Bok, 20:7774
Woo, Yun Myeoung, *See* Kuk, Il Hiun, 20:8101
Wood, J.R., Recovery of bypassed oil in the Dundee Formation using horizontal drains. Quarterly report, 4th quarter, FY 1994, 20:7222 (R;US)
Wood, M.A., *See* Levine, D.A., 20:7483
Woodruff, W.L., *See* Bretscher, M.M., 20:7763
See Deen, J.R., 20:7761
Woods, M., Polarization at SLAC, 20:8329 (R;US)
Wootton, J.C., Nonalignability and noncompactness models and reality of low-complexity protein segments, 20:8567 (RA;US)
Wright, B.W., *See* Zemanian, T.S., 20:8464
Wright, E.L.J., A linear systems description of the CO_2 laser based tangential imaging system, 20:9078 (R;US)
Wright, J., Direct measurements of transport properties are essential for site characterization, 20:7452 (R;US)
Wright, R.Q., *See* Ingersoll, D.T., 20:7648
Wright, S.A., *See* Swiler, T.P., 20:8107
Wu Ke, *See* Guo Hanying, 20:8723
Wu Xiang, *See* Zhang Yumei, 20:9039
Wu Zhihua, Evaluated neutron data file for indium, 20:8889 (RA;CN)
Evaluation of hafnium neutron cross sections, 20:8890 (RA;CN)
Evaluation of neutron nuclear data of sodium, 20:8883 (RA;CN)
See Sun Yaode, 20:8888
Wu, C.Q., Schwinger-boson studies of the single hole motion in a 2d quantum antiferromagnet, 20:9019 (R;XA)
Wu, Jin, A photoemission study of the diamond and the single crystal C_{60}, 20:8150 (R;US)
Wuosmaa, A.H., Experimental searches for exotic alpha-cluster configurations, 20:8846 (R;US)
Wyse, E.J., *See* Farmer, O.T. III, 20:7352

X

Xia Deying, *See* Zeng Jishu, 20:7292
Xiao Mingwen, *See* Lee Chengchung, 20:8976
Xiao, X.D., New vision on surface diffusion, 20:8103 (R;US)
Xie Yinyan, *See* Huang Fuduan, 20:8609
Xie, Y., *See* Xiao, X.D., 20:8103
Xu Wang, *See* Lee Chengchung, 20:8976
Xu Xiaohua, *See* Lee Chengchung, 20:8975

Y

Yakle, J., *See* Dingman, S.E., 20:7649
Yakovchenko, S.G., *See* Kotel'nikov, I.A., 20:9066
Yamada, M., *See* Hwang, Y.S., 20:9089
Yamada, Y., *See* Kasukabe, Y., 20:8151

Yamaleev, R.M., Elliptic Deformed Classical Mechanics in Three-Dimensional Phase Space, 20:8679 (R;XJ)
Yamazaki, Toshimitsu, Atomic approaches in metastable antiprotonic helium atoms. REPLY to 'analysis of the lifetimes and fractions of antiprotons trapped in metastable antiprotonic-helium states' by I. Shimamura and M. Kimura, 20:8970 (R;JP)
Yan Shiwei, *See* Cai Dunjiu, 20:8892
See Liang qichang, 20:8891
See Zhou Delin, 20:8893, 20:8894, 20:8895
Yan, C., Superharp: A wire scanner with absolute position readout for beam energy measurement at CEBAF, 20:8313 (R;US)
Yaneva, N.B., *See* Grigor'ev, Yu.V., 20:8854
Yang Fuqiang, *See* Liu Zhiping, 20:8027
Yang, Han Beom, *See* Yoo, Jae Hyeong, 20:8188
Yang, Hui-Chun, *See* Nelson, C.A., 20:8717
Yang, J.B., *See* Noh, D.S., 20:7258
Yang, J.H., Basic study on high performance secondary battery for electric load-leveling & electric vehicle, 20:7830 (R;KR;In Korean)
Yang, Jae Seung, *See* Byeon, Myeong Uh, 20:8605
See Cho, Han Ok, 20:8604
Yang, Joon Eon, *See* Yoo, Keon Joong, 20:7657
Yang, Ki Ho, *See* Cha, Hyung Ki, 20:8988
See Lee, Jong Min, 20:8169
Yang, Kyung Rin, A study on the computerization of secondary side on-line chemistry monitoring system of PWR, 20:7661 (R;KR;In Korean)
See Kim, Uh Chul, 20:8264
Yang, Maeng Ho, Analysis of the international environment for the national nuclear technology development in the post-coldwar era, 20:9140 (R;KR;In Korean)
Yang, Mang Ho, *See* Choi, Young Myung, 20:9146
Yang, Myeong Seung, A study on manufacturing and quality control technology of DUPIC fuel -A study on the direct use of spent PWR fuel in CANDU reactors-, 20:7668 (R;KR;In Korean)
Yang, Myeong Soon, *See* Sohn, Dong Seong, 20:7704
Yang, S., *See* Stock, L.M., 20:7130
Yang, Seon Kyu, *See* Chung, Moon Ki, 20:7686
Yang, Seong Hong, *See* Kim, Yong Seong, 20:7773
Yang, Seung Yeong, *See* Park, Hyeon Soo, 20:7320
Yang, Y.S, Development of the basis technique for the Local Energy, 20:7602 (R;KR;In Korean)
Yang, Y.S., Development of the high performance phase change heat transfer system(II), 20:7969 (R;KR;In Korean)
Yapuncich, M.L., User's guide and physics manual for the SCAT-Plus circuit code, 20:9176 (R;US)
Yasinsac, L., *See* McCabe, D.J., 20:7433
Yesley, M.S., ELSI Bibliography: Ethical, legal and social implications of the Human Genome Project. 1994 Supplement, 20:8578 (R;US)
Yethiraj, M., *See* Tomy, C.V., 20:8982
Yi, Jong Hoon, *See* Cha, Hyung Ki, 20:8988
See Lee, Jong Min, 20:7516, 20:8169
Yim, Jeong Sik, *See* Lee, Jae Kyung, 20:7659
Yim, Moon Ho, *See* Lee, Myeon Joo, 20:8211
Yiming Long, *See* Di Dong, 20:8674
Ylaetalo, S.I., Electrostatic precipitator penetration function for pulverised coal combustion aerosols at different boiler loadings, 20:7150 (RA;FI)
Yli-Juuti, E., Stack gas flow measurement based on fan characteristics, 20:8468 (R;SE;In Swedish)
Yokosawa, A., Proton-proton interactions using the RHIC polarized collider, 20:8776 (R;US)
Yoo, An Na, *See* Lee, Ji Ho, 20:9192
Yoo, Bong, Development of fatigue monitoring system in nuclear power plants, 20:7696 (R;KR;In Korean)
Yoo, Byung Duk, *See* Lee, Jong Min, 20:7516, 20:8169, 20:8231
Yoo, C.K., *See* Kang, Y.H., 20:7968
Yoo, Geun Jong, Development of high pressure two-phase choked flow analysis methodology in complex piping system, 20:8252 (R;KR;In Korean)
See Sim, Yoon Sub, 20:7663
Yoo, H.H., *See* Park, H.S., 20:7967
Yoo, Jae Hyeong, Development of Long-lived radionuclide partitioning technology -Development of Long-lived radionuclide transmutation technology, 20:8188 (R;KR;In Korean)
Yoo, Jang Ryoel, Development of technique on the induction and selection of in vitro mutant lines (Potato, Solanum tuberosum L.), 20:8603 (R;KR;In Korean)
Yoo, Keon Joong, Research on the improvement of nuclear safety, 20:7656 (R;KR;In Korean)
The development of integrated safety assessment technology, 20:7657 (R;KR;In Korean)
Yoo, Kun Joong, A study on the establishment of severe accident experimental facility, 20:7665 (R;KR;In Korean)
Yoo, S.S., *See* Seo, H.S., 20:7975
See Tae, C.S., 20:7974
Yoo, S.W., *See* Lee, C.H., 20:7978
See Park, K.H., 20:7979
Yoon, Byeong Joo, *See* Hwang, Churl Kew, 20:9068
Yoon, Byeong Mok, *See* Jin, Joon Ha, 20:7522, 20:7523
See Kim, Jae Rok, 20:8602
See Lee, Myeon Joo, 20:8211
Yoon, Byung Joo, *See* In, Sang Ryul, 20:9107
See Lee, Kwang Won, 20:9106
Yoon, E.S., *See* Yang, Y.S., 20:7969
Yoon, H.K., *See* Kang, Y.H., 20:7968
Yoon, Han Yeong, *See* Chang, Won Pyo, 20:9169
Yoon, Hyong Keun, *See* Ji, Young Hoon, 20:8389
Yoon, J.H., *See* Kang, Y.H., 20:7968
See Lim, S.H., 20:7972
Yoon, Jae Seong, *See* Hwang, Churl Kew, 20:9068
Yoon, Jae Sung, *See* In, Sang Ryul, 20:9107
See Lee, Kwang Won, 20:9106
Yoon, Ji Seop, *See* Park, Hyun Soo, 20:7672
Yoon, Joo Heon, *See* Chang, Won Pyo, 20:7664
Yoon, Ki Byung, *See* Moon, Byung Soo, 20:7749
Yoon, Myoung Hwan, A study on the treatment of industrial wastewater containing heavy metals, 20:8170 (R;KR;In Korean)
Yoon, Myung Hwan, A study on the treatment of industrial wastewater containing heavy metals, 20:8189 (R;KR;In Korean)
Yoon, R.H., Development of enhanced sulfur rejection processes. Final technical progress report, July 1–September 30, 1993, 20:7097 (R;US)
Development of enhanced sulfur rejection processes. Final technical progress report, fifth quarter, October 1–December 31, 1993, 20:7135 (R;US)
Yoon, Seok Cheol, *See* Chang, Si Young, 20:8623
Yoon, Su Ho, *See* Choi, Byung Ho, 20:9011
Yoon, Y.J., *See* Hong, S.H., 20:7964
Yoon, Yeo Chang, *See* Chang, Si Young, 20:8623
Yoon, Young Woo, *See* Yang, Maeng Ho, 20:9140
Yossian, D., *See* Horowitz, Y.S., 20:8350
You Jingsun, *See* Sun Yaode, 20:8888
Youm, I., Electrical conductivity study on polythiophenes films, 20:8977 (R;XA)
Younan, A.H., *See* Veletsos, A.S., 20:8225
Young, M.F., *See* Swiler, T.P., 20:8107
Young, T., Using digital filtering techniques as an aid in wind turbine data analysis, 20:7621 (R;US)
Yu Baosheng, Evaluation of neutron nuclear data for ^{7}Li, 20:8903 (RA;CN)
See Cai Dunjiu, 20:8892
See Zhou Delin, 20:8893, 20:8894, 20:8895
Yu Degui, *See* Huang Fuduan, 20:8609
Yu Minmin, *See* Qian Mingsen, 20:7580, 20:7581
Yu, C., *See* Faillace, E., 20:7467
Yu, C.K., *See* Lim, S.H., 20:7972
Yu, Dong Han, *See* Kim, Hee Dong, 20:9172
Yu, L., *See* Wu, C.Q., 20:9019
Yu, S., *See* Lee, E., 20:9123
See Li, H., 20:8304
Yu, S.S., *See* Li, H., 20:8303
Yu, Y., *See* Suuberg, E.M., 20:7115
Yuan Hanrong, *See* Zhou Delin, 20:8894, 20:8895
Yuan Wenlin, *See* Luo Cuixian, 20:9043
Yuan Zhushu, *See* Wang Yansen, 20:8899

Yuferov, A.G., *See* Linnik, V.A., 20:7679
Yuh, C., *See* Bernard, R., 20:7926, 20:7943
Yuldashev, M.B., *See* Sehrehehtehr, Zh., 20:8383
See Usmanov, P.N., 20:8865
See Veselov, G.V., 20:8382
Yun, H.K., *See* Lim, S.H., 20:7972
Yun, Y., *See* Suuberg, E.M., 20:7087, 20:7116, 20:7117, 20:7118, 20:7119, 20:7120, 20:7121
Yun, Yung Woo, *See* Kim, Hwa Sup: Yang, Maeng Ho, 20:7883
Yurevich, V.I., *See* Tsvetkov, I.O., 20:8381
Yurkov, M.V., *See* Saldin, E.L., 20:8322, 20:9105
Yushkevich, Yu.V., Highly Efficient Surface Ionisation Ion Source for Ultra-Trace Detection of Quantities of Radio Toxic Strontium Isotopes, 20:8324 (R;XJ;In Russian)

Z

Zacher, A.H., *See* Freeman, H.D., 20:7341
See Schmidt, A.J., 20:7351
Zafrir, H., *See* Pernick, A., 20:8450
Zahavi, A., *See* Dayan, D., 20:8087
Zahavi, O., Study of amplified spontaneous emission systems by ray-tracing technique, 20:8663 (RA;IL)
See Hazak, G., 20:8662
Zakara, Z., Environmental isotopic study of the Korama aquifers, south of Zinder (Niger), 20:8483 (RA;XA;In French)
Zaker, A., The study of free electrons role on creation of magnetic phases in intermetallic compounds of Gd Al_2, Gd_2 In, and La_2 Al, 20:8088 (IA;IR;In English, Persian)
Zaldivar, M.E., Characterization of MMA/LDPE copolymer films obtained by gamma radiation., 20:8206 (IA;MX)
Zalkind, S., The influence of preferred crystallographic orientation on blister size distribution in helium implanted surfaces, 20:8086 (RA;IL)
Zamfir, N.V., *See* Wolf, A., 20:8855, 20:8856
Zamir, R., *See* Hazak, G., 20:8664, 20:8665
Zankl, M., *See* Till, E., 20:7314
Zarazua-Ortega, G., *See* Avila-Perez, P., 20:8161
Zarubin, P.I., *See* Afanas'ev, S.V., 20:8376
Zasadzinski, J., Device-quality tunnel junctions on the high $T_c$superconductor $HgBa_2CuO_{4+\delta}$, 20:8117 (R;US)
Zastrow, K.D., SALOME. Software for the analysis of lines or multiplets from Extrap. User's guide, 20:9175 (R;SE)
Zbytovsky, V., Qualitative processing of uncertainty, conflicts and redundancy in knowledge bases, 20:7742 (RA;XA)
Zee, Syung Quun, *See* Chang, Jong Hwa, 20:7662
Zeller, A., *See* Biskamp, D., 20:9054
Zemanian, T.S., Extraction and detection of pesticide residues from air filter inserts using supercritical carbon dioxide, 20:8464 (R;US)
Zemlyanoj, S.G., *See* Anastasov, A., 20:8863
Zeng Jishu, Study on treatment of wastewater containing plutonium in CIAE (China Institute of Atomic Energy), 20:7292 (R;CN;In Chinese)
Zeng, Taofang,, *See* Helble, J.J., 20:7175
Zentener, A., *See* Lifshitz, Y., 20:8407
Zentner, A., *See* Barak, J., 20:8406
See Ilberg, D., 20:8408
Zeuli, A.R., *See* Tanzman, E.A., 20:8067
Zevenhoven, C.A.P., *See* Nykaenen, J., 20:7141
Zhang Dong, *See* Qian Mingsen, 20:7580, 20:7581
Zhang Jin, *See* Zhou Delin, 20:8894, 20:8895
Zhang Jingshang, The forbidden angular region of secondary particle emission in the laboratory system, 20:8872 (RA;CN)
See Zhou Delin, 20:8893, 20:8894, 20:8895
Zhang Limin, *See* Liu Ruizhe, 20:9157
Zhang Shuyu, ESAA environment for seismic activity analysis, 20:8490 (R;XA)
Zhang Yumei, Properties of a multichannel resonant-level model, 20:9039 (R;XA)
Zhang, E., *See* Mitchell, G., 20:7148
Zhang, X., Quantitation of microbial products and their effectiveness in enhanced oil recovery. Final report, 20:7199 (R;US)
Zhang, Y., *See* Flytzani-Stephanopoulos, M., 20:8436
Zhao Shu, *See* He Zhongliang, 20:7651
Zhao Yunlong, The calibration facilities of gamma-ray spectrometer oil logging system, 20:8342 (R;CN;In Chinese)
Zhao Zhixiang, Several examples of least squares combination for derived data, 20:9159 (RA;CN)
See Huang Zhongfu, 20:8852
See Zhang Jingshang, 20:8872
Zhong Wenfa, *See* Hu Yongming, 20:8944
Zhou Bangrong, Renormalization group analyses of particle masses in full four-generation fermion condensate scheme, 20:8756 (R;XA)
Zhou Chunmei, Nuclear data sheets update for A = 61, 20:8851 (RA;CN)
Progress on nuclear structure and decay data evaluation for A-chain in China, 20:8850 (RA;CN)
See Huang Xiaolong, 20:8868
See Su Zhongdi, 20:8843
Zhou Delin, Evaluation of neutron nuclear data for ^{241}Am, 20:8893 (RA;CN)
Evaluation of neutron nuclear data for ^{249}Bk, 20:8894 (RA;CN)
Evaluation of neutron nuclear data for ^{249}Cf, 20:8895 (RA;CN)
See Huang Zhongfu, 20:8852
Zhou Hongping, *See* Zeng Jishu, 20:7292
Zhou Yongyi, The evaluation of ^{31}P complete data for CENDL-2, 20:8884 (RA;CN)
Zhou Zhining, *See* Liang qichang, 20:8891
Zhou, J., Multiplicity moments in e^+e^- annihilation into hadrons at the Z^0 resonance, 20:8810 (R;US)
Zhou, O., *See* Schirber, J.E., 20:8147
Zhou, P., *See* Swain, S., 20:8956
Zhu Yanyun, *See* Wang Xiuzhen, 20:8610
Zhu Yongjun, *See* Hou Ruiqin, 20:8153
Zhu, Y., *See* Welch, D.O., 20:8119
Zhuang Youxiang, Techniques used for charged particle nuclear data evaluation at CNDC, 20:8902 (RA;CN)
See Wang Yansen, 20:8899
See Zhou Delin, 20:8893
Zhuchko, V.E., *See* Baatarkhuu, D., 20:8292
See Belov, A.G., 20:8291
Zhukov, A.V., *See* Bogatyrev, I.L., 20:7700
Zhukova, S.I., *See* Anyshchik, V.M., 20:8098
Ziada, A.H., Wind and seismic analysis for liquid-level gauge support, 20:7395 (R;US)
Ziada, H.H., Rollover analysis of rotary mode core sampler truck No. 2, 20:7501 (R;US)
Ziegler, B.D., *See* Herrmann, G.H., 20:7991
Zielke, U., Shaft furnace gasification with regard to cogeneration of heat and power. Partial report no. 2: Gasification of straw - test 1-5, 20:7549 (R;DK;In Danish)
Shaft furnace gasification with regard to cogeneration of heat and power. Partial report no 5 - Final report. Gasification of wood chips - test 8-9. Gasification of straw - test 10-14, 20:7550 (R;DK;In Danish)
Shaft furnace gasification with a view to to cogeneration of heat and power. Partial report no 4: Straw gasification - tests 6-7: gas washing, 20:7551 (R;DK;In Danish)
Zimbrick, J.D., *See* Fuciarelli, A.F., 20:8632
Zimens, V.A., *See* Kudyshev, A.N., 20:8097
Zimmer, K., *See* Yushkevich, Yu.V., 20:8324
Zimmerman, B.D., *See* Knutson, B.J., 20:7371
Zimmerman, R.E., *See* Shem, L.M., 20:7253, 20:7254
See Van Dyke, G.D., 20:7252
Zimmermann, H., Strength and elastic properties of some graphites, carbon/carbon and SiC/SiC composite materials, 20:8142 (R;DE;In German)
Zinamon, Z., *See* Zahavi, O., 20:8663
Zinina, G.A., *See* Boltenko, Eh.A., 20:7699
Zolper, J.C., GaAsSb-based heterojunction tunnel diodes for tandem solar cell interconnects, 20:7593 (R;US)
Zomorrodian, M.E., Comparison of gluon jets and quarks jets, 20:8794 (IA;IR;In English, Persian)
Zuehlke, A.C., DACS upgrade acceptance test report, 20:7394 (R;US)

Zweben, S.J., Alpha particle loss in the TFTR DT experiments, 20:9088 (R;US)

Subject Index

This index is arranged by subject descriptors selected from those assigned to each citation in this publication. Subject descriptors are selected from a controlled thesaurus of terms, ETDE/PUB–2(Rev.1), *International Energy: Subject Thesaurus*. In order to enhance indexing, subject descriptor entries generally consist of a pair of descriptors: a main term and a qualifier term. Each entry includes the full title (which may be followed by supplementary descriptive information in parentheses) and the citation number. Additional information given in parentheses indicates the document type (an abbreviation such as B for book), the country of publication (such as DE for Federal Republic of Germany), and the language if non-English.

See references guide users from synonymous terms to the descriptors selected for the concept. *See also* references indicate subject concepts that are more specific than a particular descriptor. To gain complete subject coverage, all such terms should be reviewed.

A

A RESONANCES
See MESONS

A2H-1320 RESONANCES
See MESONS

A2L-1280 RESONANCES
See MESONS

ABANDONED SHAFTS
Management of dry flue gas desulfurization by-products in underground mines. Annual report, October 1993–September 1994, 20:7153 (R;US)

ABANDONED SITES
A new monitoring network in the surroundings of old uranium mine spoil banks in the Pribram district sites, 20:8453 (IA;CZ;In Czech)
Derivation of uranium residual radioactive material guidelines for the 4400 Piehl Road Site, Ottawa Lake, Michigan, 20:7467 (R;US)

ABANDONED WELLS
Potential hydrologic characterization wells in Amargosa Valley, 20:8473 (R;US)

ABSORBED DOSES
See RADIATION DOSES

ABSORPTION REFRIGERATION CYCLE
Absorption technology, 20:7994 (RA;US)

ACCELERATOR FACILITIES
Concepts and techniques: Active electronics and computers in safety-critical accelerator operation, 20:8282 (R;US)

ACCELERATORS
See also HEAVY ION ACCELERATORS
LINEAR ACCELERATORS
100 MeV laser accelerator demonstration and 1 GeV baseline design development. 1992 Annual report, 20:8287 (R;US)
A high-energy high-luminosity $\mu^+ - \mu^-$ collider, 20:8284 (R;US)
Design study of longitudinal dynamics of the drive beam in 1 TeV relativistic klystron two-beam accelerator, 20:8303 (R;US)
Future accelerators and experiments, 20:8296 (R;US)
Intercomparison of high energy neutron personnel dosimeters, 20:8395 (R;US)
Inverse Cerenkov LPA experiments. 1986 Annual report, 20:8285 (R;US)
Inverse Cerenkov laser accelerator experiment annual report. 1990 Annual report, 20:8286 (R;US)
Parallel computation of automatic differentiation applied to magnetic field calculations, 20:8302 (R;US)
Parameters Calculation of Three Stage TRITRON-Type Accelerator, 20:8280 (R;XJ;In Russian)
Status and future prospects for United States accelerators and accelerator physics, 20:8281 (R;US)

ACCIDENTAL INTAKE
See ACCIDENTS

ACCIDENTAL IRRADIATION
See RADIATION ACCIDENTS

ACCIDENTS
See also RADIATION ACCIDENTS
REACTOR ACCIDENTS
Applications of collimated airborne monitoring in radiological emergency response, 20:8450 (RA;IL)
The use of aircraft for environmental monitoring in nuclear accidents, 20:8449 (RA;IL)

ACCOUNTABILITY (NUCLEAR MATERIALS)
See NUCLEAR MATERIALS MANAGEMENT

ACES
See QUARKS

ACETONE
Study on the hydrogen reaction technologies related to the chemical heat pump system (II), 20:7535 (R;KR;In Korean)

ACETYLENE
Conversion of light hydrocarbon gases to metal carbides for production of liquid fuels and chemicals. Quarterly technical status report, July 1–September 30, 1994, 20:7248 (R;US)
Generation, detection and characterization of gas-phase transition metal aggregates and compounds. Final technical report, September 15, 1991–July 14, 1994, 20:8181 (R;US)

ACID ELECTROLYTE FUEL CELLS
Phosphoric acid fuel cell for buses, 20:8061 (RA;US)

ACIDIFICATION
Beech (Fagus sylvatica) seedling growth and nutrition - effects of acid soils and liming, 20:8643 (R;SE)

ACQUISITION (DATA)
See DATA ACQUISITION

ACROLEIC ACID
See ACRYLIC ACID

ACRYLIC ACID
Radiation-induced synthesis and properties of fluorine-containing cation-exchange membranes, 20:8210 (IA;RU;In Russian)

ACTINIDE BURNER REACTORS
Actinide burning in fast reactors. KfK contributions to the CAPRA code, 20:7321 (RA;DE;In German)

ACTINIDES
See also AMERICIUM
PLUTONIUM
THORIUM
URANIUM
Process to remove rare earth from IFR electrolyte, 20:7278 (PA;US)

ACTINIUM D
See LEAD 207

ACTIVATED CARBON
Hydrogen storage on activated carbon. Final report, 20:7536 (R;US)

ACTIVITY COEFFICIENT
See REACTION KINETICS

ACTIVITY METERS
RADTEST, 20:8356 (RA;IL)

ACUTE IRRADIATION
The effects of acute radiation exposure on the serum components, 20:8625 (R;KR;In Korean)

ADL PROCESS
See COAL LIQUEFACTION
ADOLESCENTS
Continuation application, progress report, year IV, June 8, 1993–June 7, 1994, 20:7845 (R;US)
ADSORBENTS
See also ACTIVATED CARBON
SILICA GEL
The evaluation of potential limonene scavengers, 20:8466 (R;US)
ADVANCED LIGHT SOURCE
Advanced Light Source: Activity report 1993, 20:8335 (R;US)
ADVANCED PHOTON SOURCE
Cryogenic monochromator as a solution to undulator heat loads at third generation synchrotron sources, 20:8309 (R;US)
X-ray photoelectron spectroscopy analysis of cleaning procedures for synchrotron radiation beamline materials at the Advanced Photon Source, 20:8332 (R;US)
AEROSOLS
Aerosol particle characteristics from pressurised fluidised bed coal gasification, 20:7140 (RA;FI)
Electrical agglomeration of aerosol particles, 20:8441 (RA;FI)
Microphysical and compositional influences on shortwave radiative forcing of climate by sulfate aerosols, 20:8431 (R;US)
Numerical simulation of vapour-aerosol dynamics in high temperature processes, 20:7180 (RA;FI)
Polar stratospheric cloud formation: Nucleation and freezing mechanisms of nitric acid and sulphuric acid aerosols, 20:8443 (RA;FI)
Report series in aerosol science, 20:8437 (R;FI)
The structure of combustion-generated aerosol particles, 20:8439 (RA;FI)
Theoretical studies on electrical agglomeration of a bimodal aerosol, 20:8440 (RA;FI)
AEROSPACE INDUSTRY
Experience gained in the lightning protection of aircraft and petrochemical installations applicable to wind turbine generators, 20:8239 (RA;DK)
Review of neutron radiographic applications in industrial and biological systems, 20:7534 (R;PK)
AFRICA
See also MALI
MOROCCO
African voices on climate change. Policy concerns and potentials, 20:7862 (R;SE)
Water resources in the Sahel. Hydrogeological and hydrological studies in West Africa by isotopic techniques. Statement of accounts of studies carried out in the framework of the project RAF/8/012: Isotopic hydrology in Sahelian countries, 20:8531 (R;XA;In French)
AFTER-HEAT REMOVAL
Studies of passive after-heat removal for fast reactors, 20:7791 (RA;DE;In German)
Thermo-hydraulic investigations on passive containment cooling, 20:7809 (RA;DE;In German)
AFTERBURNERS
A study on the multi-stage combustion in incinerator with low pollution, 20:8267 (R;KR;In Korean)
AGRICULTURAL COOPERATIVES
See AGRICULTURE
AGRICULTURE
See also DAIRY INDUSTRY
Bundesforschungsanstalt fuer Landwirtschaft Braunschweig-Voelkenrode (FAL). Annual report 1992, 20:7537 (I;DE;In German)
Develop a field grid system for yield mapping and machine control. Quarterly report, October 1–December 31, 1994, 20:8598 (R;US)
Energy consumption in the primary agricultural activities. Branch analysis, 20:8030 (R;DK;In Danish)
Energy consumption in the primary agricultural activities. Branch analysis, 20:8029 (R;DK;In Danish)
Estimated effects of radioactive fallout on agricultural production in Sweden. Contamination of animal products, 20:8635 (R;SE;In Swedish)
Estimated effects of radioactive fallout on agricultural production in Sweden. Contamination of crop products, 20:8634 (R;SE;In Swedish)
Interview-survey of farmers. Experiences after the Chernobyl accident, 20:7884 (R;SE;In Swedish)
AGRINI EVENT
See NUCLEAR EXPLOSIONS
UNDERGROUND EXPLOSIONS
AIR
A brief review of environmental transport of tritium at the Los Alamos LLRW disposal facility, 20:8498 (R;US)
Outdoor air and groundwater as natural sources for cooling, 20:8000 (RA;US)
AIR CONDITIONERS
A CO_2 vapour compression system for vehicle air conditioning, 20:8015 (RA;US)
Absorption technology, 20:7994 (RA;US)
Application of "natural" refrigerants: New system concepts for the use of CO_2, 20:8016 (RA;US)
Cooling and air conditioning with water/zeolite, 20:7996 (RA;US)
High density energy storage for desiccant cooling systems, 20:8001 (RA;US)
Outdoor air and groundwater as natural sources for cooling, 20:8000 (RA;US)
AIR FILTERS
Extraction and detection of pesticide residues from air filter inserts using supercritical carbon dioxide, 20:8464 (R;US)
Technical boundary conditions for an accident filter, 20:7808 (RA;DE;In German)
AIR POLLUTION
Methods of valuing air pollution and estimated monetary values of air pollutants in various U.S. regions, 20:7849 (R;US)
Modelling the impacts of sulphur and nitrogen deposition on forests, 20:8515 (R;SE)
AIR POLLUTION ABATEMENT
Joint implementation of climatic measures, 20:7858 (R;NO;In Norwegian)
Review of research results for the photocatalytic oxidation of hazardous wastes in air, 20:8462 (R;US)
AIR POLLUTION CONTROL
Emission measurements from a urea-based SCR/oxi catalytic NO_x/HC exhaust gas treatment system on board a diesel powered passenger ferry - operation after 12000 hours service, 20:8455 (R;SE)
AIR POLLUTION MONITORING
Stack gas flow measurement based on fan characteristics, 20:8468 (R;SE;In Swedish)
AIR POLLUTION MONITORS
Operability test procedure for the 340-NT-EX stack upgrades – Project W337, 20:7458 (R;US)
AIRBORNE PARTICLES
See PARTICULATES
AIRBORNE PARTICULATES
See PARTICULATES
AIRCRAFT
Lightning protection of the Fokker 100 CFRP rudder, 20:8240 (RA;DK)
Radiological effects of an aircraft crash into the BER II research reactor. Comparison of effects for HEU and LEU fuels, 20:7785 (R;DE;In German)
AIRCRAFT ACCIDENTS
See ACCIDENTS
ALABAMA
Secondary oil recovery from selected Carter sandstone oilfields–Black Warrior Basin, Alabama. Final report, 20:7214 (R;US)
ALARA
ALARA notes, Number 8, 20:7291 (R;US)
ALARM DOSEMETERS
See RADIATION MONITORS
ALARM SYSTEMS
See also INTRUSION DETECTION SYSTEMS
A practical estimation of reliability of Geiger-Mueller tubes, 20:8366 (RA;IL)

Operability test procedure for the 340-NT-EX stack upgrades – Project W337, 20:7458 (R;US)
ALASKA RIVER
See RIVERS
ALGEBRA
Tracing a planar algebraic curve, 20:8670 (R;XA)
ALKALI METALS
See also CESIUM
LITHIUM
POTASSIUM
SODIUM
Hydrogen content determination in alkali metals, 20:8168 (IA;RU;In Russian)
ALKALINE FLOODING
See CAUSTIC FLOODING
ALKANES
See also BUTANE
CYCLOALKANES
ETHANE
METHANE
PROPANE
Pulse radiolysis of alkanes: A time-resolved electron paramagnetic resonance study, 20:8197 (R;US)
ALKYL RADICALS
Pulse radiolysis of alkanes: A time-resolved electron paramagnetic resonance study, 20:8197 (R;US)
ALLENE
Conversion of light hydrocarbon gases to metal carbides for production of liquid fuels and chemicals. Quarterly technical status report, July 1–September 30, 1994, 20:7248 (R;US)
ALLOY-50KH4N6G12F2V
See CHROMIUM ALLOYS
ALLOY-60T
See TITANIUM BASE ALLOYS
ALLOY-79NM
See NICKEL BASE ALLOYS
ALLOY-GE
See COPPER ALLOYS
ALLOY-GMR-235
See NICKEL BASE ALLOYS
ALLOY-HD-8077
See NICKEL BASE ALLOYS
ALLOY-KH20N80T
See NICKEL BASE ALLOYS
ALLOY-KHN77TYU
See NICKEL BASE ALLOYS
ALLOY-L-605
See COBALT BASE ALLOYS
ALLOY-M-252
See NICKEL BASE ALLOYS
ALLOY-MA-754
See NICKEL BASE ALLOYS
ALLOY-MA-956
See IRON BASE ALLOYS
ALLOY-MM-0011
See NICKEL BASE ALLOYS
ALLOY-VT30
See TITANIUM BASE ALLOYS
ALLOY-VTZ-1
See TITANIUM BASE ALLOYS
ALLOY-WAZ-16
See NICKEL BASE ALLOYS
ALMENDRO EVENT
See NUCLEAR EXPLOSIONS
UNDERGROUND EXPLOSIONS
ALPHA DETECTION
Training detector as simulator of alpha detector, 20:8360 (RA;IL)
ALPHA PARTICLE MODEL
See CLUSTER MODEL
ALPHA PARTICLES
Alpha particle loss in the TFTR DT experiments, 20:9088 (R;US)
Alpha spectral analysis via artificial neural networks, 20:7453 (R;US)
ALPHA REACTIONS
Progress on the evaluation of charged particle nuclear reaction data in Sichuan University, 20:8905 (RA;CN)
Twenty five years of clusters – from Bochum to Strasbourg, 20:8845 (R;US)
ALPHA-BEARING WASTES
Area 5 Site characterization project report, FY 1994, 20:7443 (R;US)
Basic TRUEX process for Rocky Flats Plant, 20:7289 (R;US)
ALS STORAGE RING
See ADVANCED LIGHT SOURCE
ALUMINATES
The study of free electrons role on creation of magnetic phases in intermetallic compounds of Gd Al_2, Gd_2 In, and La_2 Al, 20:8088 (IA;IR;In English, Persian)
ALUMINIA
See ALUMINIUM OXIDES
ALUMINIUM
Characterization of ultradispersed aluminum, 20:8111 (R;US)
NMR study of nanophase Al/Al-oxide powder and consolidated composites, 20:8136 (R;US)
Temperature dependence of microhardness for aluminium implanted with nickel ions, 20:8098 (IA;RU;In Russian)
The influence of preferred crystallographic orientation on blister size distribution in helium implanted surfaces, 20:8086 (RA;IL)
ALUMINIUM 26
^{10} Be and ^{26} Al production cross sections with 12 GeV protons measured by accelerator mass spectrometry., 20:8160 (IA;MX)
ALUMINIUM 27
NMR study of nanophase Al/Al-oxide powder and consolidated composites, 20:8136 (R;US)
ALUMINIUM ALLOYS
Robotic weld overlay coatings for erosion control. Quarterly technical progress report, July–September, 1994, 20:8078 (R;US)
Synthesis of Ni_3Al and NiAl intermetallics, 20:8075 (R;US)
ALUMINIUM BORIDES
Mechanical properties of ion-alloyed boron-bearing materials, 20:8095 (IA;RU;In Russian)
ALUMINIUM OXIDES
Cross-flow, filter-sorbent-catalyst for particulate, SO_2 and NO_x control. Final report, 20:7171 (R;US)
High performance materials in coal conversion utilization. Technical progress report, July 1–September 30, 1994, 20:8140 (R;US)
NMR study of nanophase Al/Al-oxide powder and consolidated composites, 20:8136 (R;US)
Surfactant loss control in chemical flooding: Spectroscopic and calorimetric study of adsorption and precipitation on reservoir minerals. Quarterly technical progress report, July 1, 1994–October 31, 1994, 20:7211 (R;US)
ALUMINUM
See ALUMINIUM
ALVEOLI (PULMONARY)
See LUNGS
AMBERLITE
See ORGANIC ION EXCHANGERS
AMERICIUM
Application of the species existence-predominance and distribution diagrams to the plutonium and americium electrodeposition., 20:8215 (IA;MX)
Direct measurements of transport properties are essential for site characterization, 20:7452 (R;US)
AMERICIUM 241
Evaluation of neutron nuclear data for ^{241}Am, 20:8893 (RA;CN)
AMERICIUM COMPOUNDS
Study on the extraction of Am^{3+} and rare earth elements with β-oxime extractant (7804) (I), 20:8153 (R;CN;In Chinese)
AMERICIUM PHOSPHIDES
See AMERICIUM COMPOUNDS
AMINO ACID SEQUENCE
A method to recognize distant repeats in protein sequences, 20:8557 (RA;US)
Coordinated changes in protein multiple sequence alignments, 20:8556 (RA;US)

Deriving non-homogeneous Markov chain models from the multiple alignment with the entropy criteria, 20:8574 (RA;US)

AMMONIA
Air cycle air conditioning and the use of ammonia in supermarket refrigeration systems, 20:8005 (RA;US)
Ammonia in simulated Hanford double-shell tank wastes: Solubility and effects on surface tension, 20:7339 (R;US)
City of New Orleans Ammonia District Cooling Plant. Final report, 20:8043 (R;US)
Development of novel active transport membrande devices, 20:8139 (R;US)
Generation, detection and characterization of gas-phase transition metal aggregates and compounds. Final technical report, September 15, 1991–July 14, 1994, 20:8181 (R;US)
Performance of additives in reducing ammonia emissions from cow slurry, 20:8467 (R;SE)
Simultaneous removal of H_2S and NH_3 in coal gasification processes. Quarterly report, July 1, 1994–September 30, 1994, 20:7109 (R;US)

AMMONIUM COMPOUNDS
See also AMMONIUM NITRATES
AMMONIUM THIOCYANATES
Effect of He pressure on the superconducting transition temperatures of Na_2CsC_{60} and $(NH_3)_4Na_2CsC_{60}$, 20:8147 (R;US)

AMMONIUM NITRATES
Raman spectroscopic studies in supercritical water, 20:8055 (R;US)

AMMONIUM THIOCYANATES
The Neutron Powder Diffraction and Acoustic Investigations of the NH_4SCN Phase Diagram, 20:9009 (R;XJ)

ANIMAL SHELTERS
Performance of additives in reducing ammonia emissions from cow slurry, 20:8467 (R;SE)

ANIMALS
See also WILD ANIMALS
Estimated effects of radioactive fallout on agricultural production in Sweden. Contamination of animal products, 20:8635 (R;SE;In Swedish)

ANL
Alternative futures for the Department of Energy National Laboratories, 20:7881 (R;US)
Decontamination and dismantlement of the Argonne National Laboratory-East Map Tube Facility, 20:7468 (R;US)

ANNIE EVENT
See NUCLEAR EXPLOSIONS

ANSTO
Australian Nuclear Science and Technology Organisation strategy review recommendations. Final Report, 20:9198 (I;AU)

ANTHRACITE
A study on the briquetting by improving the carbonization, 20:7142 (R;KR;In Korean)

ANTIFERROMAGNETIC MATERIALS
Dynamics of an inhomogeneous anisotropic antiferromagnetic spin chain, 20:9024 (R;XA)
Multisite antiferromagnetic Ising spin model: Phase transition through doubling bifurcation, 20:8979 (R;XA)
Schwinger-boson studies of the single hole motion in a 2d quantum antiferromagnet, 20:9019 (R;XA)

ANTIMONY
A photoemission study of the diamond and the single crystal C_{60}, 20:8150 (R;US)
Application of microtron braking gamma radiation to study heavy metal distribution in the process of coal burning, 20:8167 (IA;RU;In Russian)

ANYONS
Grand canonical potential of the anyon gas, 20:8701 (IA;IR;In English, Persian)
Screening currents in anyon superconductivity on the torus for two geometries of fixed external magnetic fields, 20:9036 (IA;IR;In English, Persian)

APARTMENT BUILDINGS
Energy use and domestic hot water consumption - Phase 1. Final report, 20:7986 (R;US)

APPARATUS
See EQUIPMENT

APPLIANCES
See also ELECTRIC APPLIANCES
FREEZERS
OVENS
WATER HEATERS
1,1,1,4,4,4 Hexafluorobutane, a new non-ozone-depleting blowing agent for rigid PUR foams, 20:8032 (RA;US)
Blowing agents: The next generation, 20:8034 (RA;US)
HFC 356, a zero ODP blowing agent candidate for North American appliance foam formulations, 20:8033 (RA;US)
Water-blown rigid urethane foam for thermal insulation, 20:8036 (RA;US)

APS STORAGE RING
See ADVANCED PHOTON SOURCE

AQUATIC ECOSYSTEMS
See also WETLANDS
Ecosystem diagnosis and treatment planning model as applied to supplementation. Model description, user guide, and theoretical documentation for the model introduce in the summary report series on supplementation in the Columbia basin, 20:8523 (R;US)
Water Science and Technology Board. Annual report 1991, 20:8525 (R;US)
Water Science and Technology Board. Annual report 1992-1993, 20:8526 (R;US)
Water Science and Technology Board. Annual report 1993-1994, 20:8527 (R;US)

AQUEOUS SOLUTIONS
Tetraethyl orthosilicate-based glass composition and method, 20:8172 (PA;US)
The influence of ionizing radiation on the formation of polymeric material from aqueous malononitrile., 20:8202 (IA;MX)

AQUIFERS
Comment on the isotopic measures of Niger in Banankoro and of Bani in the Douna-San region, 20:8535 (RA;XA;In French)
Contribution to the chemical and environmental isotopic study of the dallol Bosso acquifers (Niger), 20:8481 (RA;XA;In French)
Development of analytical and numerical models for the assessment and interpretation of hydrogeological field tests, 20:7326 (R;US)
Development of hydrogeological isotopic techniques in Sahelian countries. General framework and realization of regional project RAF/8/012 (Senegal, Mali, Niger, Cameroon), 20:8478 (RA;XA;In French)
Estimation of effective recharge of aquifers under semi-arid conditions: Example in North Senegal, 20:8479 (RA;XA;In French)
Models of natural fracture connectivity – Implications for reservoir permeability. Final report, 20:8649 (R;US)
Natural groundwater recharge in the Garoua basin (North-Cameroon): Hydrochemical and isotopic approaches, 20:8486 (RA;XA;In French)
The application of borehole logging to characterize the hydrogeology of the Faultless site, Central Nevada Test Area, 20:8472 (R;US)
Volcanic CO_2 contribution in the geochemical and isotopic equilibrium of the TIDC in the Irhazer aquifers (Niger), 20:8488 (RA;XA;In French)

ARABIDOPSIS
The fifth international conference on Arabidopsis research, 20:8597 (R;US)

ARALEX PROCESS
See RADIOACTIVE WASTE PROCESSING

ARCTIC REGIONS
Controls over nutrient flow through plants and microbes in Arctic tundra. Final technical report, 20:8586 (R;US)

ARGON HYDRIDES
Three-dimensional quantum mechanical study of exothermic reactive systems ($F+H_2$; $Ar+h^+_2$) employing imaginary arrangement decoupling potentials, 20:8183 (RA;IL)

ARGONNE NATIONAL LABORATORY
See ANL

ARGUS EVENT
See NUCLEAR EXPLOSIONS

ARID LANDS
Passive control of VOCs using valved well heads: FY1994 report, 20:7508 (R;US)

ARIZONA
Supai salt karst features: Holbrook Basin, Arizona, 20:7246 (R;US)

ARMS CONTROL
Director's series on proliferation, 20:8068 (R;US)
Fourth and Fifth Amendment issues raised by Chemical Weapons Convention inspections, 20:8066 (R;US)
Legal aspects of national implementation of the Chemical Weapons Convention, 20:8067 (R;US)

AROMATIC COMPOUNDS
See AROMATICS

AROMATICS
Hydrodenitrogenation mechanism of aromatic amines. Kinetic study and simulation, 20:7902 (R;FR;In French)

ARRAY PROCESSORS
A practical approach to portability and performance problems on massively parallel supercomputers, 20:9177 (R;US)
DOLIB: Distributed Object Library, 20:9181 (R;US)
Parallel computation of automatic differentiation applied to magnetic field calculations, 20:8302 (R;US)

ARSENIC
Application of microtron braking gamma radiation to study heavy metal distribution in the process of coal burning, 20:8167 (IA;RU;In Russian)

ARTHUR D LITTLE COAL LIQUEFACTION PROCESS
See COAL LIQUEFACTION

ASHES
See also FLY ASH
Application of microtron braking gamma radiation to study heavy metal distribution in the process of coal burning, 20:8167 (IA;RU;In Russian)
Field study of circulating fluidized-bed ash. Final report, April 1986–October 1994, 20:7151 (R;US)
Fundamental study of ash formation and deposition: Effect of reducing stoichiometry. Quarterly report No. 6, 1 July–30 September 1994, 20:7175 (R;US)
Investigation of mineral transformations and ash deposition during staged combustion. Quarterly technical progress report, July 1–September 30, 1994, 20:7178 (R;US)
Management of dry flue gas desulfurization by-products in underground mines. Annual report, October 1993–September 1994, 20:7153 (R;US)
Sonic enhanced ash agglomeration and sulfur capture. Technical progress report, July 1994–September 1994, 20:7152 (R;US)

ASPHALTENES
Configurational diffusion of asphaltenes in fresh and aged catalyst extrudates. Quarterly progress report, 20 June 1994–20 September 1994, 20:7133 (R;US)
Hindered diffusion of coal liquids. Quarterly report No. 8, June 18, 1994–September 17, 1994, 20:7136 (R;US)

ASPHALTS
See also ASPHALTENES
Hanford Permanent Isolation Barrier Program: Asphalt technology data and status report - FY 1994, 20:7341 (R;US)

ASTRONOMY
A generic data exchange scheme between FITS format and C structures, 20:8690 (R;US)

ASTROPHYSICS
Nuclear Science Division: 1993 Annual report, 20:8844 (R;US)

ATGAS PROCESS
See COAL GASIFICATION

ATMOSPHERIC PRECIPITATIONS
A numerical prediction of the precipitation and hydrology of California, 20:8653 (R;US)
Comment on the evolution of the isotopic composition of rainfall from a squall line (Niamey, Niger), 20:8536 (RA;XA;In French)

ATOMIC BEAM SOURCES
Development of ultrasensitive spectroscopic analysis technology -Development of atomic spectroscopy technology-, 20:8988 (R;KR;In Korean)

ATOMIC BEAMS
Reflection and diffraction of atomic de Broglie waves by evanescent laser waves. Bare-state method, 20:8957 (R;AU)

ATOMIC BOMBS
See NUCLEAR WEAPONS

ATOMIC CLOUDS
See RADIOACTIVE CLOUDS

ATOMIC EXPLOSIONS
See NUCLEAR EXPLOSIONS

ATOMIC FLUORESCENCE SPECTROSCOPY
See FLUORESCENCE SPECTROSCOPY

ATOMIC SHELLS (K)
See K SHELL

ATOMIC WEAPONS
See NUCLEAR WEAPONS

ATOMS
See also ISOELECTRONIC ATOMS
Atoms as many-body systems, 20:8951 (R;US)
Probe transparency in a two-level medium embedded by a squeezed vacuum, 20:8956 (R;XA)

AUTOMATION
A feasibility study for a manufacturing technology deployment center, 20:8021 (R;US)

AUTOMOBILE EFFICIENCY STANDARDS
See AUTOMOBILES

AUTOMOBILE EXHAUST REACTORS
See AFTERBURNERS

AUTOMOBILES
A CO_2 vapour compression system for vehicle air conditioning, 20:8015 (RA;US)
Application of "natural" refrigerants: New system concepts for the use of CO_2, 20:8016 (RA;US)
Cooling and air conditioning with water/zeolite, 20:7996 (RA;US)
Development of a dedicated ethanol ultra-low emission vehicle (ULEV) system design, 20:8064 (R;US)

AUTOMOTIVE FUELS
Efficiency evaluation and plan for extensive use of newly developed energy saving products- OA equipment energy saver and vehicle fuel economizer, 20:7977 (R;KR;In Korean)
Refining and end use of coal liquids. Quarterly report, April–June 1994, 20:7123 (R;US)
Reformulated gasoline study, executive summary, 20:7242 (R;US)
Scenarios for introduction of bio-ethanol, 20:8065 (R;SE;In Swedish)
The selective catalytic cracking of Fischer-Tropsch liquids to high value transportation fuels. Quarterly technical progress report No. 5, first quarter fiscal year 1993, October 1, 1992–December 31, 1992, 20:7229 (R;US)
The selective catalytic cracking of Fischer-Tropsch liquids to high value transportation fuels. Quarterly technical status report for first quarter fiscal year, 1994 - report No. 41, October 1, 1993–December 31, 1993, 20:7230 (R;US)

AVALANCHE QUENCHING
MRS Silicon Avalanche Detectors with Negative Feedback for Time-of-Flight Systems, 20:8376 (RA;XJ)

AVG PROCESS
See COAL GASIFICATION

AXIONS
Measurement of the magnetically-induced QED birefringence of the vacuum and an improved search for laboratory axions: Technical report. Project definition study of the use of assets and facilities of the Superconducting Super Collider Laboratory, 20:8754 (R;US)

AXOLOTL
Surface contraction and expansion waves correlated with differentiation in axolotl embryos. III. The shape of the fate map, 20:8571 (RA;US)

AZINES
ADMPT and its synthesis, 20:8190 (PA;US)

Synthesis of 3,6-diamino-1,2,4,5-tetrazine, 20:8423 (PA;US)

B

B MESONS
B physics with CDF: Recent results and future prospects, 20:8787 (R;US)
On hadronic production of the B_c meson, 20:8790 (R;XA)
BACON
See MEAT
BACTERIA
See also COLIFORMS
ESCHERICHIA COLI
SULFATE-REDUCING BACTERIA
Can we estimate bacterial growth rates from ribosomal RNA content?, 20:8595 (R;US)
Polysaccharides and bacterial plugging. Final report, 1992–1993, 20:7200 (R;US)
BAILIE PROCESS
See WASTE PROCESSING
BALTIC SEA
Tectonic framework of the Hanoe Bay area, southern Baltic Sea, 20:8514 (R;SE)
BAMAG PROCESS
See WASTE PROCESSING
BAND THEORY
The quantum interference effect in semiconductor space charge layers studied by Feynman path integrals. General formalism and illustrative examples, 20:9040 (R;XA)
BANEBERRY EVENT
See NUCLEAR EXPLOSIONS
UNDERGROUND EXPLOSIONS
BANKS
See COMMERCIAL BUILDINGS
BARIUM 126
Gamma spectroscopy for examination of light Ba isotopes after beta decay, 20:8869 (I;DE;In German)
BARIUM 128
Gamma spectroscopy for examination of light Ba isotopes after beta decay, 20:8869 (I;DE;In German)
BARIUM 130
Gamma spectroscopy for examination of light Ba isotopes after beta decay, 20:8869 (I;DE;In German)
BARIUM COMPOUNDS
See also BARIUM OXIDES
Solution based synthesis of perovskite-type oxide films and powders, 20:8127 (R;US)
BARIUM OXIDES
Characterization of superconducting thin films by rutherford backscattering analysis, 20:8985 (IA;IR;In English, Persian)
Device-quality tunnel junctions on the high $T_c$superconductor $HgBa_2CuO_{4+\delta}$, 20:8117 (R;US)
Microstructure and composition of a SNS Josephson junction using $CaRuO_3$ as the metallic barrier, 20:9026 (R;US)
Processing of single- and multi-domain $YBa_2Cu_3O_x$ bulk materials for levitation applications by $Nd_{1+x}Ba_{2-x}Cu_3O_y$ seeding, 20:8118 (R;US)
Solution based synthesis of perovskite-type oxide films and powders, 20:8127 (R;US)
The real structure of columnar pinning centers in heavy-ion-irradiated cuprate superconductors, 20:8119 (R;US)
Zone refining of sintered, microwave-derived YBCO superconductors, 20:8116 (R;US)
BARLEY
Evaluation of recurrent radiation with Cobalt 60 gamma rays on agronomic traits of barley (Hordeum Vulgare L.) in the R_2M_1 generation., 20:8615 (I;MX;In Spanish)
BARYON OCTETS
Unitarization of Koerner-Kuroda model of electromagnetic structure of octet 1/2+ baryons, 20:8792 (R;XA)
BARYON SPECTROSCOPY
Baryon spectroscopy and the omega minus, 20:8824 (R;US)
BASS STRAIT
See SEAS
BATTELLE PACIFIC NORTHWEST LABORATORIES
Alternative futures for the Department of Energy National Laboratories, 20:7881 (R;US)
Staff exchange with Spokane Intercollegiate Research and Technology Institute (SIRTI), final project report, 20:7878 (R;US)
BATTERIES (ELECTRIC)
See ELECTRIC BATTERIES
BCC LATTICES
Ordered compounds under irradiation: dynamical equilibrium phase diagrams and microstructural evolutions, 20:8074 (R;FR;In French)
BCR PROCESS
See COAL GASIFICATION
BEAM BENDING MAGNETS
Algorithm for model-based diagnosis of the beam line, 20:8314 (R;RU;In Russian)
Radiation and radiation reaction in continuous focusing channels, 20:8326 (R;US)
BEAM DUMPS
Bremsstrahlung scattering calculations for the beam stops and collimators in the APS insertion-device beamlines, 20:8298 (R;US)
BEAM EXTRACTION
JINR rapid communications. Collection 6, 20:8860 (R;XJ;In English, Russian)
BEAM FOCUSING MAGNETS
Radiation and radiation reaction in continuous focusing channels, 20:8326 (R;US)
BEAM MONITORS
Method and apparatus for measuring the intensity and phase of an ultrashort light pulse, 20:8271 (PA;US)
BEAM OPTICS
Algorithm for model-based diagnosis of the beam line, 20:8314 (R;RU;In Russian)
BEAM POSITION
Superharp: A wire scanner with absolute position readout for beam energy measurement at CEBAF, 20:8313 (R;US)
BEAM TRANSPORT
Bremsstrahlung scattering calculations for the beam stops and collimators in the APS insertion-device beamlines, 20:8298 (R;US)
BEARINGS
Purex canyon exhaust fan bearing temperature monitoring system doric 245 datalogger programming, 20:7408 (R;US)
BEEF
See MEAT
BENHAM EVENT
See NUCLEAR EXPLOSIONS
UNDERGROUND EXPLOSIONS
BENIOFF ZONE
See EARTHQUAKES
BER-2 REACTOR
Radiological effects of an aircraft crash into the BER II research reactor. Comparison of effects for HEU and LEU fuels, 20:7785 (R;DE;In German)
BERKELIUM 249
Evaluation of neutron nuclear data for ^{249}Bk, 20:8894 (RA;CN)
BERLIN-2 RESEARCH REACTOR
See BER-2 REACTOR
BERYLLIA
See BERYLLIUM OXIDES
BERYLLIUM
Beryllium in the ITER blanket, 20:9092 (R;US)
Optimization of beryllium for fusion blanket applications, 20:9091 (R;US)
Statistical methods for the analysis of a screening test for chronic beryllium disease, 20:8644 (R;US)
BERYLLIUM 10
^{10} Be and ^{26} Al production cross sections with 12 GeV protons measured by accelerator mass spectrometry., 20:8160 (IA;MX)
BERYLLIUM 8
Mixing phases of unstable two-level systems, 20:8847 (R;RU)

BERYLLIUM ALLOYS
The influence of preferred crystallographic orientation on blister size distribution in helium implanted surfaces, 20:8086 (RA;IL)
BERYLLIUM MODERATORS
See BERYLLIUM
BERYLLIUM OXIDES
Beryllium in the ITER blanket, 20:9092 (R;US)
BETA BEAMS (ELECTRONS)
See ELECTRON BEAMS
BETA BEAMS (POSITRONS)
See POSITRON BEAMS
BETA DECAY RADIOISOTOPES
Gamma spectroscopy for examination of light Ba isotopes after beta decay, 20:8869 (I;DE;In German)
BETHE-SALPETER EQUATION
Scale-invariant Lipatov kernels from t-channel unitarity, 20:8709 (R;US)
BGO DETECTORS
Design (Ge-BGO+NaI(Tl)) of Anti-Compton Spectrometer, 20:8385 (R;XJ;In Russian)
BHABHA SCATTERING
Electroweak coupling measurements from polarized Bhabha scattering at the Z^0 resonance, 20:8812 (R;US)
BIOCENOSES
See ECOSYSTEMS
BIOCONVERSION
Bioprocessing in nonaqueous media - critical needs and opportunities, 20:7570 (R;US)
BIOGAS
See METHANE
BIOGEOCENOSES
See ECOSYSTEMS
BIOLOGICAL MATERIALS
See also BIOLOGICAL WASTES
Review of neutron radiographic applications in industrial and biological systems, 20:7534 (R;PK)
BIOLOGICAL WASTES
See also MANURES
SEWAGE SLUDGE
AFBC co-firing of coal and hospital waste. Quarterly progress report, August 1, 1994–October 31, 1994, 20:7168 (R;US)
BIOLOGY
Science is in the eye of the beholder, 20:8551 (RA;US)
The limits to reason what science can know about everyday events, 20:8550 (RA;US)
BIOMASS
Analysis of straw and straw ashes. Part 4. Research and development countries concerning analysis and characterization of biomass fuels. State of the art, 20:7556 (R;DK)
Appendix model performance - model documentation renewable fuels module of the National Energy Modeling System, 20:7886 (R;US)
Biologically produced succinic acid: A new route to chemical intermediates, 20:7543 (R;US)
Bioprocessing in nonaqueous media - critical needs and opportunities, 20:7570 (R;US)
Clean fractionation of biomass, 20:7544 (R;US)
Report to the Department of Energy on the DOE/EPSCoR planning activities for the state of South Dakota, 20:8221 (R;US)
Research projects in 1994, 20:7541 (R;FI;In Finnish, English)
BIOSPHERE
Uncertainty and sensitivity analysis of chronic exposure results with the MACCS reactor accident consequence model, 20:7820 (R;US)
Uncertainty and sensitivity analysis of early exposure results with the MACCS Reactor Accident Consequence Model, 20:7821 (R;US)
BISMUTH
Nuclear-spin-dependent parity-nonconserving effects in thallium, lead and bismuth atoms, 20:8953 (R;RU)
BISMUTH 209
Nuclear anapole moments in single-particle approximation, 20:8848 (R;RU)
BISMUTH 209 TARGET
The Mott-Schwinger effect in neutron elastic scattering from ^{209}Bi, 20:8941 (R;AU)
BISMUTH GERMANATE DETECTORS
See BGO DETECTORS
BISMUTH OXIDES
Cooling rate effects on the microstructure, critical current density, and $T_c$transition of one- and two-powder BSCCO-2223 Ag-sheathed tapes, 20:8115 (R;US)
Effects of Bi and Bi_2O_3 additions on the microstructure and superconducting properties of powder-in-tube BSCCO (2212) tapes, 20:8113 (R;US)
Oxygen stoichiometry and its influence on superconductivity in $Bi_2Sr_2CaCu_2O_{8+x}$, 20:8114 (R;US)
Solution based synthesis of perovskite-type oxide films and powders, 20:8127 (R;US)
The real structure of columnar pinning centers in heavy-ion-irradiated cuprate superconductors, 20:8119 (R;US)
BITUMINOUS COAL
Development of enhanced sulfur rejection processes. Final technical progress report, fifth quarter, October 1–December 31, 1993, 20:7135 (R;US)
Development of enhanced sulfur rejection processes. Final technical progress report, July 1–September 30, 1993, 20:7097 (R;US)
Effect of pretreating of host oil on coprocessing. Quarterly progress report, July 1–September 30, 1994, 20:7128 (R;US)
Field studies on ash transformation during pulverized coal combustion of bituminous coal, 20:7182 (RA;FI)
Investigation of mineral transformations and ash deposition during staged combustion. Quarterly technical progress report, July 1–September 30, 1994, 20:7178 (R;US)
Molecular accessibility in oxidized and dried coals. Quarterly report, 20:7147 (R;US)
Particle emissions from pressurized fluidized bed combustion, 20:7183 (RA;FI)
Real scale studies on alkali metal transformations in atmospheric CFBC of coal, 20:7181 (RA;FI)
Surface properties of photo-oxidized bituminous coals. Technical progress report, July–September, 1994, 20:7148 (R;US)
The role of the resid solvent in coprocessing with finely divided catalysts. Quarterly report, July–September, 1994, 20:7129 (R;US)
BLACK CLAWSON SYSTEM
See WASTE PROCESSING
BLACK LIQUORS
See SPENT LIQUORS
BLADES (TURBINES)
See TURBINE BLADES
BLANKETS (BREEDING)
See BREEDING BLANKETS
BLOOD
Effect of rouleaux size of erythrocyte on blood viscosity, 20:8700 (R;XA)
BLOOD FLOW
Fluorescent image tracking velocimeter, 20:8592 (PA;US)
BLOOD SERUM
The effects of acute radiation exposure on the serum components, 20:8625 (R;KR;In Korean)
BLOWERS
Field measurements of heating efficiency of electric forced-air furnaces in six manufactured homes, 20:7960 (R;US)
BNL
Alternative futures for the Department of Energy National Laboratories, 20:7881 (R;US)
Laboratory Directed Research and Development Program: Annual report to the Department of Energy, 20:9127 (R;US)
BODY CENTERED CUBIC
See BCC LATTICES
BOGOLYUBOV TRANSFORMATION
Extension of the QPM to $T \neq 0$ Based on the Formalism of the Thermo Field Dynamics, 20:8861 (R;XJ)
BOGOLYUBOV-VALATIN RELATION
See BOGOLYUBOV TRANSFORMATION

BOHUNICE V-1 REACTOR
TIS process supervisory local area network (LAN), 20:7711 (RA;XA)
BOHUNICE V-2 REACTOR
TIS process supervisory local area network (LAN), 20:7711 (RA;XA)
BOILING WATER COOLED AND MODERATED REACTOR
See BWR TYPE REACTORS
BOLTZMANN-VLASOV EQUATION
Dressing symmetry of the uniformization solution of Liouville equation, 20:8675 (R;XA)
BOM REFINING DISTRICTS
See PETROLEUM REFINERIES
BOMBS
Crushable structure performance determined from reconstructed dynamic forces during impact tests, 20:8424 (R;US)
BONE JOINTS
Energy and Technology Review, 20:9129 (R;US)
BORON
A photoemission study of the diamond and the single crystal C_{60}, 20:8150 (R;US)
Mechanical properties of ion-alloyed boron-bearing materials, 20:8095 (IA;RU;In Russian)
BORON CARBIDES
Mechanical properties of ion-alloyed boron-bearing materials, 20:8095 (IA;RU;In Russian)
BORON NITRIDES
Electric conductivity of ion implanted boron nitride, 20:8124 (IA;RU;In Russian)
BOSONS
See also GLUONS
MESONS
PHOTONS
Probing anomalous gauge boson couplings at LEP, 20:8753 (R;US)
BOTTOMONIUM
Study of $b\bar{b}$ production in e^+e^- annihilation at $\sqrt{s} = 29$ GeV with the aid of neural networks, 20:8803 (R;US)
BOWLINE OPERATION
See NUCLEAR EXPLOSIONS
UNDERGROUND EXPLOSIONS
BOXCAR EVENT
See NUCLEAR EXPLOSIONS
UNDERGROUND EXPLOSIONS
BRACKISH WATER ECOSYSTEMS
See AQUATIC ECOSYSTEMS
BREAKWATERS
See DAMS
BREEDER REACTORS
See also FBR TYPE REACTORS
Status of the solid breeder materials database, 20:7674 (R;US)
BREEDING BLANKETS
In situ tritium from Li_2O and Li_2ZrO_3 irradiated in a fast neutron flux: BEATRIX-II, Phase 1 and 2, 20:9124 (R;US)
Optimization of beryllium for fusion blanket applications, 20:9091 (R;US)
Progress in tritium retention and release modeling for ceramic breeders, 20:7675 (R;US)
U.S. technical report for the ITER blanket/shield: A. blanket: Topical report, July 1990–November 1990, 20:9104 (R;US)
Validation of tritium transport models for Li_2O, 20:9090 (R;US)
BRIQUETS
Emissions reductions in coal-fired home heating stoves through use of briquettes. Quarterly report, April 1, 1994–June 30, 1994, 20:7100 (R;US)
Emissions reductions in coal-fired home heating stoves through use of briquettes. Quarterly report, July 1, 1994–September 30, 1994, 20:7101 (R;US)
BRONCO EVENT
See NUCLEAR EXPLOSIONS
BROOKHAVEN NATIONAL LABORATORY
See BNL
BROOKHAVEN RHIC
Proton-proton interactions using the RHIC polarized collider, 20:8776 (R;US)
Thermal effects on the STAR electromagnetic calorimeter, 20:8340 (R;US)
BROWN COAL
See also LIGNITE
Application of microtron braking gamma radiation to study heavy metal distribution in the process of coal burning, 20:8167 (IA;RU;In Russian)
The future of brown coal mining in Germany. Lectures, 20:7187 (I;DE;In German)
BUBIAG-DIDIER PROCESS
See COAL GASIFICATION
BUILDINGS
See also ANIMAL SHELTERS
COMMERCIAL BUILDINGS
GREENHOUSES
HOSPITALS
OFFICE BUILDINGS
PREFABRICATED BUILDINGS
PUBLIC BUILDINGS
RESIDENTIAL BUILDINGS
SCHOOL BUILDINGS
A Study on energy oriented intelligent building system(II) - development of emulator/tester, 20:7975 (R;KR;In Korean)
A study on energy conservation in heat source distribution system(II), 20:7974 (R;KR;In Korean)
A study on retrofit measures of KIER buildings for energy conservation, 20:7967 (R;KR;In Korean)
Atmospheric dispersion estimates in the vicinity of buildings, 20:7760 (R;US)
Development of oil heat chimney venting tables, 20:7958 (RA;US)
Differences between the 1992 and 1993 CABO Model Energy Codes, 20:8008 (R;US)
Gas cooling - a worldwide overview, 20:7995 (RA;US)
High density energy storage for desiccant cooling systems, 20:8001 (RA;US)
Load test of the 277W Building high bay roof deck and support structure, 20:7494 (R;US)
Outdoor air and groundwater as natural sources for cooling, 20:8000 (RA;US)
Tracer gas measurement techniques. Active methods to identify volumes, air flows, flow paths and flow patterns in single family houses, 20:7983 (R;SE;In Swedish)
Turning research into results, final report, 20:7961 (R;US)
What is the actual diffusion of pollutants through the earth surface/cellar floor? Can flux-chamber measurements give an answer?, 20:8503 (RA;DK;In Danish)
BURNER FUEL OIL
See HEATING OILS
BUSES
Phosphoric acid fuel cell for buses, 20:8061 (RA;US)
BUSINESS
See also SMALL BUSINESSES
Workflow automation architecture standard, 20:9151 (R;US)
BUTANE
1,1,1,4,4,4 Hexafluorobutane, a new non-ozone-depleting blowing agent for rigid PUR foams, 20:8032 (RA;US)
Blowing agents: The next generation, 20:8034 (RA;US)
HFC 356, a zero ODP blowing agent candidate for North American appliance foam formulations, 20:8033 (RA;US)
Novel process for depolymerization of coal to C_2-C_4 hydrocarbons. Final report, 1 September 1989–31 August 1993, 20:7111 (R;US)
BUTANOLS
Heterogeneous catalytic process for alcohol fuels from syngas. Ninth quarterly technical progress report, January 1994–March 1994, 20:7565 (R;US)
Heterogeneous catalytic process for alcohol fuels from syngas. Tenth quarterly technical progress report, April 1994–June 1994, 20:7566 (R;US)
Mass transfer model for two-layer TBP oxidation reactions, 20:7437 (R;US)

BUTYL ALCOHOLS
See BUTANOLS
BUTYRIC ALCOHOLS
See BUTANOLS
BWR TYPE REACTORS
See also GRAND GULF-1 REACTOR
GRAND GULF-2 REACTOR
An expert system for diagnosing failures in the condensate system of the Laguna Verde Nuclear Power Plant, 20:7744 (RA;XA)
FASMON monitoring of space dependent oscillations in a BWR, 20:7706 (R;SE)
Safety-related LWR research. Annual report 1993, 20:7798 (R;DE;In German, English)
The boiling water reactor transfer function studies by non-linear dynamical equations, 20:7646 (IA;IR;In English, Persian)

C

C-1430 RESONANCES
See MESONS
CABLES (ELECTRIC)
See ELECTRIC CABLES
CABRIOLET EVENT
See NUCLEAR EXPLOSIONS
CADMIUM
Cadmium in Salix. A study to show the capacity of Salix to remove cadmium from farmland, 20:8517 (R;SE;In Swedish)
Development of ultrasensitive spectroscopic analysis technology -Development of atomic spectroscopy technology-, 20:8988 (R;KR;In Korean)
Ion exchange of Cobalt and Cadmium in Zeolite X., 20:8165 (I;MX;In Spanish)
The evaluation of natural cadmium neutron data, 20:8888 (RA;CN)
CADMIUM 104
Latest information on ^{104}Cd, 20:8858 (IA;IR;In English, Persian)
CALABASH EVENT
See NUCLEAR EXPLOSIONS
UNDERGROUND EXPLOSIONS
CALCIUM
Evaluation of neutron nuclear data of natural calcium for CENDL-2, 20:8885 (RA;CN)
CALCIUM 40 TARGET
Gamma-ray measurements at the WNR white neutron source, 20:8937 (R;US)
Studies of the spin-isospin response of the nuclear continuum using intermediate energy hadrons. Final technical report, May 20, 1987–April 30, 1994, 20:8907 (R;US)
CALCIUM 48 TARGET
Studies of the spin-isospin response of the nuclear continuum using intermediate energy hadrons. Final technical report, May 20, 1987–April 30, 1994, 20:8907 (R;US)
CALCIUM FLUORIDES
Temperature and dose dependence of metal colloid production in alpha-irradiated CaF_2, 20:8144 (R;US)
Thermodynamic modeling of hydrogen fluoride production relevant to actinide residue treatment, 20:7263 (R;US)
CALCIUM OXIDES
Cooling rate effects on the microstructure, critical current density, and $T_c$transition of one- and two-powder BSCCO-2223 Ag-sheathed tapes, 20:8115 (R;US)
Device-quality tunnel junctions on the high $T_c$superconductor $HgBa_2CuO_{4+\delta}$, 20:8117 (R;US)
Effects of Bi and Bi_2O_3 additions on the microstructure and superconducting properties of powder-in-tube BSCCO (2212) tapes, 20:8113 (R;US)
Microstructure and composition of a SNS Josephson junction using $CaRuO_3$ as the metallic barrier, 20:9026 (R;US)
Oxygen stoichiometry and its influence on superconductivity in $Bi_2Sr_2CaCu_2O_{8+x}$, 20:8114 (R;US)
Solution based synthesis of perovskite-type oxide films and powders, 20:8127 (R;US)
The real structure of columnar pinning centers in heavy-ion-irradiated cuprate superconductors, 20:8119 (R;US)
CALCULATIONS (3-DIMENSIONAL)
See THREE-DIMENSIONAL CALCULATIONS
CALDERAS
Transport in porous and fractured media of the Creede Formation, 20:7606 (R;US)
CALIFORNIA
Community radiation monitoring program. Annual report, October 1, 1992–September 30, 1993, 20:8435 (R;US)
Toward resolving model-measurement discrepancies of radon entry into houses, 20:8460 (R;US)
Toxic volatile organic compounds in environmental tobacco smoke: Emission factors for modeling exposures of California populations, 20:8461 (R;US)
CALIFORNIUM 238
Spontaneous Fission of Light Californium Isotopes Produced in the ^{206,207,208}Pb + ^{34,36}S Reactions; New Nuclide ^{238}Cf, 20:8931 (R;XJ)
CALIFORNIUM 249
Cross section of the californium 249 photofission, 20:8919 (IA;RU;In Russian)
Evaluation of neutron nuclear data for ^{249}Cf, 20:8895 (RA;CN)
CALORICON PROCESS
See WASTE PROCESSING
CALORIMETERS
Addendum 3 to CSAR 80-027, Use of calorimeter 109B for fissile material measurement, 20:8246 (R;US)
CALORIMETERS (PARTICLE)
See SHOWER COUNTERS
CANCER
See NEOPLASMS
CANDU TYPE REACTORS
A study on manufacturing and quality control technology of DUPIC fuel -A study on the direct use of spent PWR fuel in CANDU reactors-, 20:7668 (R;KR;In Korean)
CANDU operator decision support systems: Lessons learned and future directions, 20:7715 (RA;XA)
DUPIC facility engineering -A study on the direct use of spent PWR fuel in CANDU reactors-, 20:7672 (R;KR;In Korean)
Design and analysis of CANDU advanced fuel -Development of the advanced CANDU technology-, 20:7669 (R;KR;In Korean)
Development of advanced CANDU PHWR -Development of the advanced CANDU technology-, 20:7673 (R;KR;In Korean)
Development of fabrication technology for CANDU advanced fuel -Development of the advanced CANDU technology-, 20:7671 (R;KR;In Korean)
Fuel management and safety analysis -A study on the direct use of spent PWR fuel in CANDU reactors-, 20:7683 (R;KR;In Korean)
Technology development for nuclear material safeguards -A study on the direct use of spent PWR fuel in CANDU-, 20:7510 (R;KR;In Korean)
Verification tests for CANDU advanced fuel -Development of the advanced CANDU technology-, 20:7670 (R;KR;In Korean)
CANINES
See DOGS
CANISTERS
See CONTAINERS
CANNIKIN EVENT
See NUCLEAR EXPLOSIONS
UNDERGROUND EXPLOSIONS
CAPACITORS
Electrochemical supercapacitors, 20:7832 (PA;US)
CARBINOL
See METHANOL
CARBOHYDRATES
Structural studies of complex carbohydrates of plant cell walls. Progress report, June 15, 1992–June 14, 1993, 20:8568 (R;US)
CARBON
See also ACTIVATED CARBON
DIAMONDS
FULLERENES
GRAPHITE

Characterization and performance of carbon films deposited by plasma and ion beam based techniques, 20:9012 (R;US)
Determination of micro-amount carbon in sodium metal by vacuum distillation-gas chromatography, 20:8152 (R;CN;In Chinese)
High surface area, high permeability carbon monoliths, 20:8146 (R;US)
Power oscillator in the Tokamaks training., 20:9053 (I;MX;In Spanish)
Recent advances in lithium ion technology, 20:7833 (R;US)
Strength and elastic properties of some graphites, carbon/carbon and SiC/SiC composite materials, 20:8142 (R;DE;In German)
Structural investigation of xenon ion-beam-irradiated glassy carbon, 20:9015 (R;AU)
X-ray and neutron scattering from amorphous diamondlike carbon and hydrocarbon films, 20:8989 (R;DK)

CARBON 12 REACTIONS
Ambiguities in strong absorption parametrisations of nuclear scattering data, 20:8939 (R;AU)

CARBON 12 TARGET
Gamma-ray measurements at the WNR white neutron source, 20:8937 (R;US)
Pion Momentum Spectra in Nuclear Charge Exchange Reactions A(t, ^{3} He), 20:8928 (R;XJ)
Rapidity Distributions of Protons in (p, d, α, C)C-Interactions at 4.2 GeV/c per Nucleon, 20:8933 (R;XJ;In Russian)
Studies of the spin-isospin response of the nuclear continuum using intermediate energy hadrons. Final technical report, May 20, 1987–April 30, 1994, 20:8907 (R;US)
Study of Features in Particle and Event Characteristics in Nucleus-Nucleus Interaction, 20:8932 (R;XJ;In Russian)

CARBON 13
The effect of O_2 intercalation on the rotational dynamics and the ordering transition of C_{60}, 20:8175 (R;US)

CARBON COMPOUNDS
See also CARBON NITRIDES
Comparative study of Total Organic Carbon (TOC) methods for high-level mixed waste, 20:7346 (R;US)

CARBON DIOXIDE
A CO_2 vapour compression system for vehicle air conditioning, 20:8015 (RA;US)
A calcium oxide sorbent process for bulk separation of carbon dioxide, 20:7102 (R;US)
Absorption technology, 20:7994 (RA;US)
Application of "natural" refrigerants: New system concepts for the use of CO_2, 20:8016 (RA;US)
CO_2 taxation in the EU, 20:7846 (I;DK)
Determination of micro-amount carbon in sodium metal by vacuum distillation-gas chromatography, 20:8152 (R;CN;In Chinese)
Development of novel active transport membrande devices, 20:8139 (R;US)
Economic analysis of nuclear power generation, 20:7860 (R;KR;In Korean)
Energy and sustainability: a global view, 20:7835 (IA;CH)
Environmental impacts of ocean disposal of CO_2. First quarterly report, September 1–September 30, 1994, 20:7856 (R;US)
Evaluation of instruments and incentives for limitation of carbon dioxide emissions in Sweden, 20:7903 (R;SE;In Swedish)
Handbook of methods for the analysis of the various parameters of the carbon dioxide system in sea water. Version 2, 20:8544 (R;US)
Internalisation of external costs in Switzerland and Europe, 20:7843 (IA;CH)
Investigation of technologies for CO_2 separation, fixation and disposal for the prevention of global warming, 20:8456 (R;KR;In Korean)
Standardization of $^{13}CO_2$ production procedure from organic matter for mass spectrometric analysis, 20:8174 (R;PK)
Study on the production of alternative fuels by carbon dioxide hydrogenation (I), 20:7569 (R;KR;In Korean)
The photosynthetic acclimation of Lolium perenne growing in a free-air CO_2 enrichment (FACE) system, 20:8585 (R;US)
Theory and practice of internalisation of external costs, 20:7842 (IA;CH;In German)

CARBON DIOXIDE ACCEPTOR PROCESS
See COAL GASIFICATION

CARBON DIOXIDE LASERS
A linear systems description of the CO_2 laser based tangential imaging system, 20:9078 (R;US)

CARBON MONOXIDE
Carbon monoxide oxidation over three different states of copper: Development of a model metal oxide catalyst, 20:8063 (R;US)
Development of a catalyst for conversion of syngas-derived materials to isobutylene. Quarterly report number 11, October 1–December 31, 1993, 20:7563 (R;US)
Modeling of single char combustion, including CO oxidation in its boundary layer, 20:7170 (R;US)
New vision on surface diffusion, 20:8103 (R;US)

CARBON NITRIDES
Synthesis of carbo-nitride films using high-energy shock plasma deposition, 20:8134 (R;AU)

CARBON TETRACHLORIDE
Direct measurements of transport properties are essential for site characterization, 20:7452 (R;US)

CARDIOVASCULAR DISEASES
See also THROMBOSIS
^{99m}Tc-Teboroxime as an alternative to ^{201}Thalium for myocardial perfusion imaging. Preliminary study, 20:8587 (RA;IL)

CARDIOVASCULAR SYSTEM
Monoclonal antibody (SZ-51) specific for activated platelets is useful in the diagnosis of thrombosis. Final report for the period December 1990 - April 1994, 20:8589 (R;XA)

CARIBOU
See DEER

CARPETBAG EVENT
See NUCLEAR EXPLOSIONS
UNDERGROUND EXPLOSIONS

CASCADE (EXTRACTION)
See EXTRACTION COLUMNS

CASKS
See also SPENT FUEL CASKS
Equivalence relations for the 9972-9975 SARP, 20:7285 (R;US)
Performance of the SKB copper/steel canister, 20:7361 (R;SE)

CATALASE
Catalase as an indicator of microbial contamination in fuel oil, 20:7954 (RA;US)

CATALYSTS
Configurational diffusion of asphaltenes in fresh and aged catalyst extrudates. Quarterly progress report, 20 June 1994–20 September 1994, 20:7133 (R;US)
Development of a catalyst for conversion of syngas-derived materials to isobutylene. Quarterly report number 11, October 1–December 31, 1993, 20:7563 (R;US)
Direct catalytic decomposition of nitric oxide. Quarterly technical progress report number 12, July–September, 1994, 20:8436 (R;US)
High octane ethers from synthesis gas-derived alcohols. Quarterly technical progress report, January–March, 1993, 20:7564 (R;US)
Molecular catalytic coal liquid conversion. Quarterly progress report, 20:7130 (R;US)
New nanophase iron-based catalysts for hydrocracking applications, 20:7231 (R;US)
Synthesis and characterization of FE colloid catalysts in inverse micelle solutions, 20:8194 (R;US)
Usability of catalytic gas cleaning in a simplified IGCC power system. Deactivation of Ni/Al_2O_3 catalysts. Literature review, 20:7640 (R;FI)

CATHODES
Lithium ferrate and lithium cobaltate cathodes for molten carbonate fuel cells, 20:7925 (RA;US)

CAUSTIC FLOODING
Detailed evaluation of the West Kiehl alkaline-surfactant-polymer field project and it's application to mature Minnelusa waterfloods. Technical progress report, July–September, 1994, 20:7203 (R;US)

CAVITY RESONATORS
High gradient tests of SLAC Linear Collider Accelerator Structures, 20:8328 (R;US)
CE LUMMUS CFFC PROCESS
See COAL LIQUEFACTION
CEBAF ACCELERATOR
Superharp: A wire scanner with absolute position readout for beam energy measurement at CEBAF, 20:8313 (R;US)
CELL MEMBRANES
Contribution of ankyrin-band 3 complexes to the organization and mechanical properties of the membrane skeleton of human erythrocyte, 20:8552 (R;US)
CELL WALL
Structural studies of complex carbohydrates of plant cell walls. Progress report, June 15, 1992–June 14, 1993, 20:8568 (R;US)
CELLS (BACTERIAL)
See BACTERIA
CENTER-OF-MASS SYSTEM
The forbidden angular region of secondary particle emission in the laboratory system, 20:8872 (RA;CN)
CENTRAL REGION
See USA
CENTRE-OF-MASS SYSTEM
See CENTER-OF-MASS SYSTEM
CEPFR-1 REACTOR
See ZERO POWER REACTORS
CERAMIC MELTERS
Oxygen enriched combustion system performance study. Phase 2: 100 percent oxygen enriched combustion in regenerative glass melters, Final report, 20:8023 (R;US)
CERAMICS
Development of Hi-Tech ceramics fabrication technologies - Development of advanced nuclear materials-, 20:8125 (R;KR;In Korean)
Feasibility of ceramic joining with high energy electron beams, 20:8130 (R;US)
Ion implantation and thermal stress resistance of ceramics, 20:8132 (R;AU)
Progress in tritium retention and release modeling for ceramic breeders, 20:7675 (R;US)
CERCLA
See US SUPERFUND
CERIUM
Direct catalytic decomposition of nitric oxide. Quarterly technical progress report number 12, July–September, 1994, 20:8436 (R;US)
CERIUM 137
Photoactivation of isomer ^{137}Ce in the region of giant dipole resonance, 20:8923 (IA;RU)
CERIUM 138 TARGET
Photoactivation of isomer ^{137}Ce in the region of giant dipole resonance, 20:8923 (IA;RU)
CERIUM ALLOYS
Antiferromagnetic instability of heavy-fermion alloys with conduction band impurities, 20:8975 (R;XA)
CERIUM OXIDES
Cross-flow, filter-sorbent-catalyst for particulate, SO_2 and NO_x control. Final report, 20:7171 (R;US)
Investigation of combined SO_2/NO_x removal by Ceria sorbents. Quarterly technical progress report, July 1994–September 1994, 20:7154 (R;US)
CERMETS
Ion beam modification of hard alloy surfaces, 20:8123 (IA;RU;In Russian)
CESIUM
Bench-scale treatability studies for simulated incinerator scrubber blowdown containing radioactive cesium and strontium, 20:7335 (R;US)
Project Caesium - An ion exchange model for the prediction of distribution coefficients of caesium in bentonite, 20:8195 (R;SE)
Removal of cesium from aluminum decladding wastes generated in irradiated target processing using a fixed-bed column of resorcinol-formaldehyde resin, 20:7334 (R;US)
CESIUM 133
Nuclear anapole moments in single-particle approximation, 20:8848 (R;RU)
CESIUM 137
Cesium cobaltdicarbollide-solubility, precipitation, and reactivity in basic aqueous solution, 20:7433 (R;US)
Chernobyl cesium in the Swedish moose population: Effect of age, diet and habitat selection, 20:8508 (R;SE)
Data summary for the near-shore sediment characterization task of the Clinch River Environmental Restoration Program, 20:7483 (R;US)
The cascade of reservoirs of the "Mayak" Plant: Case history and the first version of a computer simulator, 20:7479 (R;US)
Web technology in the separation of strontium and cesium from INEL-ICPP radioactive acid waste (WM-185), 20:7342 (R;US)
CESIUM COMPOUNDS
See also CESIUM IODIDES
Cesium cobaltdicarbollide-solubility, precipitation, and reactivity in basic aqueous solution, 20:7433 (R;US)
Effect of He pressure on the superconducting transition temperatures of Na_2CsC_{60} and $(NH_3)_4Na_2CsC_{60}$, 20:8147 (R;US)
CESIUM IODIDES
Characteristics of secondary electron emission from CsI induced by X rays with energies up to 100 keV, 20:8993 (RA;IL)
CESTODES
The lethal effect of gamma irradiation on the meta cestode of Taenia solium in pork., 20:8613 (IA;MX)
CFC
See CHLOROFLUOROCARBONS
CHALCOGENIDES
Defect structure and superconducting properties of $La_{1.8}Sr_xCa_{1.2-x}Cu_2O_{6-\delta}$, 20:8083 (RA;IL)
CHALKS
See LIMESTONE
CHARGE-EXCHANGE REACTIONS
Experimental Results on Charge Exchange Reactions with Δ Excitations and Polarization Studies of Δ and N* (1440) Resonances, 20:8926 (R;XJ)
JINR rapid communications. Collection 6, 20:8860 (R;XJ;In English, Russian)
CHARGED PARTICLES
See also ALPHA PARTICLES
DEUTERONS
Techniques used for charged particle nuclear data evaluation at CNDC, 20:8902 (RA;CN)
CHARGED-PARTICLE ACTIVATION
See CHARGED PARTICLES
CHARGED-PARTICLE TRANSPORT THEORY
EGS4 in '94: A decade of enhancements, 20:8950 (R;US)
CHARM PARTICLES
Elementary particle physics. Progress report, July 1992–October 1994, 20:8784 (R;US)
Probing new physics in rare charm processes, 20:8818 (R;US)
CHARPAK CHAMBERS
See MULTIWIRE PROPORTIONAL CHAMBERS
CHARS
Char particle fragmentation and its effect on unburned carbon during pulverized coal combustion. Quarterly report, April 1–June 30, 1994, 20:7176 (R;US)
Modeling of single char combustion, including CO oxidation in its boundary layer, 20:7170 (R;US)
Rate inhibition of steam gasification by adsorbed hydrogen. Quarterly technical progress report, July 1–September 30, 1994, 20:7568 (R;US)
Simultaneous in-situ measurements of temperature and size of burning char particles in a fluidized bed furnace by means of fiber optic pyrometry, 20:7185 (RA;FI)
CHEMICAL ANALYSIS
Comparative study of Total Organic Carbon (TOC) methods for high-level mixed waste, 20:7346 (R;US)
Road Transportable Analytical Laboratory (RTAL) system. Quarterly progress report, August 1994–October 1994, 20:8154 (R;US)

Spectrophotometric method for the determination of Thorium in urine using anionic resin and arsenazo (III)., 20:8159 (IA;MX)
Tetraethyl orthosilicate-based glass composition and method, 20:8172 (PA;US)

CHEMICAL EFFLUENTS
Analysis of chemical factors affecting marine ecosystem around nuclear power plant, 20:7755 (R;KR;In Korean)
Development of analytical and numerical models for the assessment and interpretation of hydrogeological field tests, 20:7326 (R;US)
Environmental Monitoring Plan, United States Department of Energy, Richland Operations Office. Revision 1, 20:7444 (R;US)
Ground water impact assessment report for the 216-B-3 Pond system, 20:7455 (R;US)
Toxicological benchmarks for screening potential contaminants of concern for effects on aquatic biota: 1994 Revision, 20:8476 (R;US)

CHEMICAL EXPLOSIONS
A study of small explosions and earthquakes during 1961–1989 near the Semipalatinsk Test Site, Kazakhstan, 20:8429 (R;US)

CHEMICAL EXPLOSIVES
An assessment of high-energy explosives and metal contamination in soil at TA-67 (12), L-Site, and TA-14, Q-Site, 20:8420 (R;US)
High explosive spot test analyses of samples from Operable Unit (OU) 1111, 20:8497 (R;US)
Hydrolysis of plutonium: Corrosion kinetics in DMSO solutions containing simulated high explosive and water, 20:8421 (R;US)
Synthesis of 3,6-diamino-1,2,4,5-tetrazine, 20:8423 (PA;US)

CHEMICAL FEEDSTOCKS
Bioprocessing in nonaqueous media - critical needs and opportunities, 20:7570 (R;US)

CHEMICAL HEAT PIPES
See HEAT PIPES

CHEMICAL INDUSTRY
Development of the software for energy savings in chemical processes(I), 20:8026 (R;KR;In Korean)

CHEMICAL PLANTS
A feasibility study on the industialization of catalytic process in connection with domestic chemical plants, 20:7518 (R;KR;In Korean)
A general procedure for the synthesis of process flowsheets. Final report, July 16, 1991–July 31, 1993, 20:8020 (R;US)
Studies on control of integrated plants, 20:8031 (R;NO)

CHEMICAL REACTORS
A laminar entrained flow reactor for the study of aerosol formation and deposition during black liquor combustion and pyrolysis, 20:7545 (RA;FI)
A simulated countercurrent moving-bed chromatographic reactor for the oxidative coupling of methane: Experimental results, 20:7571 (R;US)
New novel cleaning technique for extending mean time between mechanical cleans in a Genus tungsten CVD reactor, 20:8106 (R;US)
Understanding and improving materials processing through interpreting and manipulating predictive models, 20:8108 (R;US)

CHEMICAL WARFARE
Facility agreements under the chemical weapons convention inspections, 20:8418 (R;US)

CHEMICAL WARFARE AGENTS
Fourth and Fifth Amendment issues raised by Chemical Weapons Convention inspections, 20:8066 (R;US)
Legal aspects of national implementation of the Chemical Weapons Convention, 20:8067 (R;US)
Program of technical assistance to the organization for the prohibition of chemical weapons, informal report, 20:8419 (R;US)

CHEMICAL WASTES
See also CHEMICAL EFFLUENTS
Detection and quantitative analysis of ferrocyanide and ferricyanide: FY 93 Florida State University Raman spectroscopy report, 20:8178 (R;US)
P-Area Acid/Caustic Basin groundwater monitoring report, second quarter 1994, 20:7507 (R;US)
Three-dimensional conceptual model for the Hanford Site unconfined aquifer system: FY 1994 status report, 20:8512 (R;US)

CHERENKOV COUNTERS
Test of a conceptual prototype of the total internal reflection Cherenkov imaging detector (DIRC) with cosmic muons, 20:8401 (R;US)

CHERENKOV DETECTORS
See CHERENKOV COUNTERS

CHERNOBYLSK-4 REACTOR
Chernobyl cesium in the Swedish moose population: Effect of age, diet and habitat selection, 20:8508 (R;SE)

CHEVRON COAL LIQUEFACTION PROCESS
See COAL LIQUEFACTION

CHI RESONANCES
See MESONS

CHI-2800 RESONANCES
See MESONS

CHI-3455 RESONANCES
See MESONS

CHIMNEYS
Development of oil heat chimney venting tables, 20:7958 (RA;US)
Results of the validation of the oil heat vent analysis program (OHVAP), 20:7957 (RA;US)

CHINA
China's nuclear power programme and the projected production and consumption of plutonium, 20:7266 (RA;XA)
Chinese-Finnish cooperative research work on dam break hydrodynamics, 20:7582 (RA;FI)
Industrial sector energy conservation programs in the People's Republic of China during the seventh five-year plan (1986–1990), 20:8027 (R;US)
Investigation report of dam safety research in China, 20:7581 (RA;FI)

CHINA CLAY
See KAOLIN

CHINA INSTITUTE OF ATOMIC ENERGY
See CIAE

CHIRAL SYMMETRY
What's wrong with anomalous chiral gauge theory?, 20:8748 (R;AU)

CHLOR-ALKALI INDUSTRY
See CHEMICAL INDUSTRY
SODIUM HYDROXIDES

CHLORINATED ALIPHATIC HYDROCARBONS
See also CARBON TETRACHLORIDE
1,1,1,4,4,4 Hexafluorobutane, a new non-ozone-depleting blowing agent for rigid PUR foams, 20:8032 (RA;US)
Blowing agents: The next generation, 20:8034 (RA;US)
Diffusion of volatile organic components through concrete floors, 20:8504 (RA;DK;In Danish)
HFC 356, a zero ODP blowing agent candidate for North American appliance foam formulations, 20:8033 (RA;US)

CHLOROFLUOROCARBONS
1,1,1,4,4,4 Hexafluorobutane, a new non-ozone-depleting blowing agent for rigid PUR foams, 20:8032 (RA;US)
A CO_2 vapour compression system for vehicle air conditioning, 20:8015 (RA;US)
Application of "natural" refrigerants: New system concepts for the use of CO_2, 20:8016 (RA;US)
Blowing agents: The next generation, 20:8034 (RA;US)
CFC- and FHC-free refrigerators by FORON Hausgeraete Co. - a breakthrough in household refrigeration, 20:8002 (RA;US)
Cyclopentane as blowing agent for rigid polyurethane foam in refrigerator insulation, 20:8035 (RA;US)
Flammable refrigerants in household refrigerators, 20:8004 (RA;US)
HFC 356, a zero ODP blowing agent candidate for North American appliance foam formulations, 20:8033 (RA;US)
Materials compatibility and lubricants research on CFC-refrigerant substitutes. Quarterly MCLR program technical progress report, 1 July 1994–30 September 1994, 20:8432 (R;US)
Natures refrigerant - propane, 20:8006 (RA;US)

Sealed tube comparisons of the compatibility of desiccants with refrigerants and lubricants. Quarterly technical progress report, July 1994–September 1994, 20:7962 (R;US)
The conversion of German household-appliance refrigeration industry from CFC's to hydrocarbons and fluorocarbons in 1993, 20:8003 (RA;US)

CHROMATOGRAPHIC COLUMNS
See EXTRACTION COLUMNS

CHROMIUM
Comparison of radiochemical and spectrophotometric detection methods for HPLC-separated Cr(III) hydrolytic species., 20:8163 (IA;MX)
Epitaxial growth of bcc transition metal films and superlattices onto MgO (111), (011) and (001) substrates, 20:8071 (R;US)

CHROMIUM ALLOYS
Swelling and structure of vanadium-base alloys irradiated in the dynamic helium charging experiment, 20:8070 (R;US)

CHROMIUM HYDROXIDES
The solubility of $Cr(OH)_3$(am) in concentrated NaOH and NaOH-$NaNO_3$ solutions, 20:7349 (R;US)

CHROMIUM OXIDES
Heterogeneous catalytic process for alcohol fuels from syngas. Ninth quarterly technical progress report, January 1994–March 1994, 20:7565 (R;US)
K-shell ionization under zone axis electron diffraction conditions, 20:9018 (R;AU)
Processing of $LaCrO_3$ for solid oxide fuel cell applications, 20:7929 (RA;US)

CHROMODYNAMICS
See QUANTUM CHROMODYNAMICS

CHROMOSOMES
Physical mapping in the presence of errors: The chimeric clones problem, 20:8576 (RA;US)

CIAE
Computer program library at CNDC, 20:9157 (RA;CN)

CIRCUITS (ELECTRONIC)
See ELECTRONIC CIRCUITS

CISTRONS
See GENES

CITIES
See URBAN AREAS

CITREX PROCESS
See WASTE PROCESSING

CLAYS
See also KAOLIN
Sorption of radioactive Cobalt by sepiolite., 20:8216 (IA;MX)

CLEAN AIR ACTS
The Energy Information Administration's assessment of reformulated gasoline: An update, 20:7238 (R;US)

CLERICAL PERSONNEL
See PERSONNEL

CLIMATE MODELS
Computational load in model physics of the parallel NCAR community climate model, 20:8430 (R;US)

CLIMATES
Oxygen-18 content of modern vegetal organic matter in Senegal; relation with climatic parameters, 20:8451 (RA;XA;In French)

CLIMATIC CHANGE
See also GREENHOUSE EFFECT
"Abrupt change" scenarios. Global scenarios revisited with respect to emerging scientific insights, 20:7891 (RA;CH)
African voices on climate change. Policy concerns and potentials, 20:7862 (R;SE)
Betting on climate states. The impact of climate change prospects on decision making under "strong" uncertainty and collective risks, 20:7900 (RA;CH)
Climate change and discount rates, 20:7893 (RA;CH)
Decision making framework to address climate change, 20:7897 (RA;CH)
Decision-making under environmental uncertainty, 20:7895 (RA;CH)
Environmental problems and attitudes towards risk and uncertainty, 20:7896 (RA;CH)
Geothermal Program Review 12: Geothermal Energy and the President's Climate Change Action Plan, 20:7607 (R;US)
Global environmental risks and financial instruments, 20:7898 (RA;CH)
Global warming damage and the risk of a climate catastrophe, 20:7892 (RA;CH)
Insurable risk associated to climate change, 20:7865 (RA;CH)
On the opportunity cost of climate change and policy, 20:7894 (RA;CH)
Portfolio analysis model of climate change decision making, 20:7899 (RA;CH)
Recent findings with respect to climate development, 20:7850 (IA;CH)
Steps towards a decision making framework to address climate change, 20:7890 (R;CH)

CLINCH RIVER
Data summary for the near-shore sediment characterization task of the Clinch River Environmental Restoration Program, 20:7483 (R;US)

CLOUD COVER
Use of cloud observations and mesoscale meteorology models to evaluate and improve cloud parameterizations. Technical progress report, 1 October 1993–30 December 1994, 20:8433 (R;US)

CLOUDINESS (METEOROLOGY)
See CLOUD COVER

CLOUDS
See also RADIOACTIVE CLOUDS
Effects of nitric acid vapour on the radiative properties of convective clouds, 20:8442 (RA;FI)

CLUSTER MODEL
JINR rapid communications. Collection 6, 20:8860 (R;XJ;In English, Russian)
Twenty five years of clusters – from Bochum to Strasbourg, 20:8845 (R;US)

CLUSTERS (SOLID)
See SOLID CLUSTERS

CO-GENERATION
See COGENERATION

COAL
See also BROWN COAL
COAL FINES

Bioconversion
Molecular biological enhancement of coal desulfurization: Cloning and expression of the sulfoxide/sulfone/sulfonate/sulfate genes in pseudomonads and Thiobacillae. Third quarterly report, January 1990–March 1990, 20:7113 (R;US)
Molecular biological enhancement of coal desulfurization: Cloning and expression of the sulfoxide/sulfone/sulfonate/sulfate genes in pseudomonads and Thiobacillae. First quarterly report, July 1989–September 1989, 20:7112 (R;US)

Briquetting
Emissions reductions in coal-fired home heating stoves through use of briquettes. Quarterly report, April 1, 1994–June 30, 1994, 20:7100 (R;US)
Emissions reductions in coal-fired home heating stoves through use of briquettes. Quarterly report, July 1, 1994–September 30, 1994, 20:7101 (R;US)

Chemical Composition
Emissions reductions in coal-fired home heating stoves through use of briquettes. Quarterly report, April 1, 1994–June 30, 1994, 20:7100 (R;US)
Isotopic and chemical characterization of coal in Pakistan, 20:7161 (R;PK)

Cocombustion
AFBC co-firing of coal and hospital waste. Quarterly progress report, August 1, 1994–October 31, 1994, 20:7168 (R;US)
Co-firing high sulfur coal with refuse derived fuels. Technical progress report No. 1, [September–November 1994], 20:7179 (R;US)

Combustion
A coal-fired combustion system for industrial process heating applications. Quarterly technical progress report, April 1994–June 1994, 20:7172 (R;US)
Air toxics evaluation of ABB Combustion Engineering Low-Emission Boiler Systems, 20:7174 (R;US)
Blast furnace granular coal injection project. Annual report, January–December 1993, 20:7169 (R;US)
Electrostatic precipitator penetration function for pulverised coal combustion aerosols at different boiler loadings, 20:7150 (RA;FI)
Fundamental study of ash formation and deposition: Effect of reducing stoichiometry. Quarterly report No. 6, 1 July–30 September 1994, 20:7175 (R;US)

Combustion Kinetics
Char particle fragmentation and its effect on unburned carbon during pulverized coal combustion. Quarterly report, April 1–June 30, 1994, 20:7176 (R;US)
Combustion of pulverized coal in vortex structures. Quarterly progress report number 4, July 1–September 30, 1994, 20:7177 (R;US)
Modeling of single char combustion, including CO oxidation in its boundary layer, 20:7170 (R;US)
Particulate behavior in a controlled-profile pulverized coal-fired reactor: A study of coupled turbulent particle dispersion and thermal radiation transport. Quarterly technical progress report, June 15–September 14, 1994, 20:7173 (R;US)

Combustion Products
Sonic enhanced ash agglomeration and sulfur capture. Technical progress report, July 1994–September 1994, 20:7152 (R;US)

Combustion Properties
Emissions reductions in coal-fired home heating stoves through use of briquettes. Quarterly report, July 1, 1994–September 30, 1994, 20:7101 (R;US)

Desulfurization
Molecular biological enhancement of coal desulfurization. Final report, 20:7114 (R;US)
Molecular biological enhancement of coal desulfurization: Cloning and expression of the sulfoxide/sulfone/sulfonate/sulfate genes in pseudomonads and Thiobacillae. First quarterly report, July 1989–September 1989, 20:7112 (R;US)
Molecular biological enhancement of coal desulfurization: Cloning and expression of the sulfoxide/sulfone/sulfonate/sulfate genes in pseudomonads and Thiobacillae. Third quarterly report, January 1990–March 1990, 20:7113 (R;US)

Flotation
Hydrocarbon-oil encapsulated air bubble flotation of fine coal. Technical progress report for the third quarter, April 1, 1991–June 30, 1991, 20:7094 (R;US)

Fluidized-Bed Combustion
Co-firing high sulfur coal with refuse derived fuels. Technical progress report No. 1, [September–November 1994], 20:7179 (R;US)
Coolside waste management research. Quarterly report, July 1, 1994–September 30, 1994, 20:7633 (R;US)

Fluidized-Bed Combustors
Energy research - as seen by industry, 20:7841 (IA;CH)

Hydrocracking
Novel process for depolymerization of coal to C_2-C_4 hydrocarbons. Final report, 1 September 1989–31 August 1993, 20:7111 (R;US)

Isotope Ratio
Isotopic and chemical characterization of coal in Pakistan, 20:7161 (R;PK)

Molecular Structure
Macromolecular structure analysis and effective liquefaction pretreatment. Annual technical report, [October 1991–December 1991], 20:7118 (R;US)
Macromolecular structure analysis and effective liquefaction pretreatment. Quarterly technical progress report, 1 April 1992–30 June 1992, 20:7120 (R;US)

Oxidation
Further studies of the effects of oxidation on the surface properties of coal and coal pyrite, 20:7144 (R;US)

Pakistan
Isotopic and chemical characterization of coal in Pakistan, 20:7161 (R;PK)

Particulates
Development of CCS application technology in industries (II), 20:7188 (R;KR;In Korean)

Performance
Development of a coal quality expert. Technical progress report No. 16, 20:7630 (R;US)

Staged Combustion
Sonic enhanced ash agglomeration and sulfur capture. Technical progress report, July 1994–September 1994, 20:7152 (R;US)

Storage
Development of CCS application technology in industries (II), 20:7188 (R;KR;In Korean)

Structural Chemical Analysis
Macromolecular structure analysis and effective liquefaction pretreatment. Annual technical report, [October 1991–December 1991], 20:7118 (R;US)
Macromolecular structure analysis and effective liquefaction pretreatment. Quarterly technical progress report, 1 April 1992–30 June 1992, 20:7120 (R;US)
Macromolecular structure analysis and effective liquefaction pretreatment. Quarterly technical progress report, 1 July 1992–30 September 1992, 20:7121 (R;US)
Organosulphur compounds in coals as determined by reaction with Raney nickel and microscale pyrolysis techniques. First quarterly report, July 1, 1994–September 30, 1994, 20:7149 (R;US)

Surface Properties
Further studies of the effects of oxidation on the surface properties of coal and coal pyrite, 20:7144 (R;US)

Swelling
A new model of coal-water interaction and relevance for dewatering. Final report, 20:7087 (R;US)
Macromolecular structure analysis and effective liquefaction pretreatment. Eighth quarterly technical progress report, [October–December 1992], 20:7122 (R;US)
Macromolecular structure analysis and effective liquefaction pretreatment. Quarterly technical progress report, 1 July 1992–30 September 1992, 20:7121 (R;US)
Macromolecular structure analysis and effective liquefaction pretreatment. Quarterly technical progress report, 1 April 1992–30 June 1992, 20:7120 (R;US)
Macromolecular structure analysis and effective liquefaction pretreatment. Quarterly technical progress report, 1 January 1991–31 March 1991, 20:7115 (R;US)
Macromolecular structure analysis and effective liquefaction pretreatment. Quarterly technical progress report, 1 April 1991–30 June 1991, 20:7116 (R;US)
Macromolecular structure analysis and effective liquefaction pretreatment. Quarterly technical progress report, 1 July 1991–30 September 1991, 20:7117 (R;US)
Macromolecular structure analysis and effective liquefaction pretreatment. Quarterly technical progress report, 1 January 1992–31 March 1992, 20:7119 (R;US)

Transportation Systems
Development of CCS application technology in industries (II), 20:7188 (R;KR;In Korean)

Water Removal
A new model of coal-water interaction and relevance for dewatering. Final report, 20:7087 (R;US)
Evaluation of hyperbaric filtration for fine coal dewatering. Eighth quarterly technical progress report, July 1, 1994–September 30, 1994, 20:7137 (R;US)

COAL FINES
Bench-scale testing of the micronized magnetite process. Quarterly technical progress report No. 1, July–September 1994, 20:7096 (R;US)

Hydrocarbon-oil encapsulate bubble flotation of fine coal. Technical progress report for the seventh quarter, April 1, 1992–June 30, 1992, 20:7090 (R;US)
Hydrocarbon-oil encapsulate bubble flotation of fine coal. Technical progress report for the eighth quarter, July 1, 1992–September 30, 1992, 20:7091 (R;US)
Hydrocarbon-oil encapsulated air bubble flotation of fine coal. 1st Quarterly report, October 1, 1990–December 31, 1990, 20:7088 (R;US)
Hydrocarbon-oil encapsulated air bubble flotation of fine coal. Technical progress report for the second quarter, January 1, 1991–March 31, 1991, 20:7093 (R;US)
Hydrocarbon-oil encapsulated air bubble flotation of fine coal. Technical progress report for the fifth quarter, October 1, 1991–December 30, 1991, 20:7166 (R;US)
Hydrocarbon-oil encapsulated bubble flotation of fine coal. Technical progress report for the fourth quarter, July 1, 1991–September 30, 1991, 20:7095 (R;US)
Hydrocarbon-oil encapsulated bubble flotation of fine coal. Technical progress report for the sixth quarter, January 1, 1992–March 30, 1992, 20:7089 (R;US)
Hydrocarbon-oil encapsulated bubble flotation of fine coal. Technical progress report for the ninth quarter, October 1, 1992–December 31, 1992, 20:7092 (R;US)
Removal of pyrite and trace elements from waste coal by dissolved-CO_2 flotation and chelating agents. Final technical report, September 1, 1993–August 31, 1994, 20:7098 (R;US)

COAL GAS
A calcium oxide sorbent process for bulk separation of carbon dioxide, 20:7102 (R;US)
Advanced sulfur control concepts in hot-gas desulfurization technology: Phase 1, Feasibility of the direct production of elemental sulfur during the regeneration of high temperature desulfurization sorbents, 20:7107 (R;US)
Pilot gasification and hot gas cleanup operations, 20:7108 (R;US)
Trace species removal for fuel cell application, 20:7931 (RA;US)

COAL GASIFICATION
Advanced sulfur control concepts in hot-gas desulfurization technology: Phase 1, Feasibility of the direct production of elemental sulfur during the regeneration of high temperature desulfurization sorbents, 20:7107 (R;US)
Pilot gasification and hot gas cleanup operations, 20:7108 (R;US)
Scale-up of mild gasification to a process development unit. Quarterly report, February 1994–May 1994, 20:7103 (R;US)
Simultaneous removal of H_2S and NH_3 in coal gasification processes. Quarterly report, July 1, 1994–September 30, 1994, 20:7109 (R;US)
Toms Creek Integrated Gasification Combined Cycle Demonstration Project. Quarterly progress report, July 1, 1994–September 30, 1994, 20:7106 (R;US)

COAL INDUSTRY
Coal mining situation in the Federal Republic of Germany. First half-year 1994, 20:7165 (I;DE;In German)

COAL LIQUEFACTION
See also TSL PROCESS
A characterization and evaluation of coal liquefaction process streams. Quarterly technical progress report, June 29–September 30, 1994, 20:7138 (R;US)
Advanced direct coal liquefaction concepts. Executive summary, Volume 1, 20:7125 (R;US)
Catalytic multi-stage liquefaction of coal. Seventh quarterly report-final, April 1, 1994–June 30, 1994, 20:7134 (R;US)
Economic feasibility study: CFR advanced direct coal liquefaction process. Volume 4, 20:7126 (R;US)
Effect of pretreating of host oil on coprocessing. Quarterly progress report, July 1–September 30, 1994, 20:7128 (R;US)
Highly dispersed catalysts for coal liquefaction. Quarterly report No. 12, May 23, 1994–August 22, 1994, 20:7124 (R;US)
Low severity coal liquefaction promoted by cyclic olefins. Quarterly report, July–September, 1994, 20:7131 (R;US)
Macromolecular structure analysis and effective liquefaction pretreatment. Annual technical report, [October 1991–December 1991], 20:7118 (R;US)
Macromolecular structure analysis and effective liquefaction pretreatment. Eighth quarterly technical progress report, [October–December 1992], 20:7122 (R;US)
Macromolecular structure analysis and effective liquefaction pretreatment. Quarterly technical progress report, 1 January 1992–31 March 1992, 20:7119 (R;US)
Macromolecular structure analysis and effective liquefaction pretreatment. Quarterly technical progress report, 1 April 1992–30 June 1992, 20:7120 (R;US)
Macromolecular structure analysis and effective liquefaction pretreatment. Quarterly technical progress report, 1 July 1991–30 September 1991, 20:7117 (R;US)
Macromolecular structure analysis and effective liquefaction pretreatment. Quarterly technical progress report, 1 January 1991–31 March 1991, 20:7115 (R;US)
Macromolecular structure analysis and effective liquefaction pretreatment. Quarterly technical progress report, 1 July 1992–30 September 1992, 20:7121 (R;US)
Macromolecular structure analysis and effective liquefaction pretreatment. Quarterly technical progress report, 1 April 1991–30 June 1991, 20:7116 (R;US)
New nanophase iron-based catalysts for hydrocracking applications, 20:7231 (R;US)
The role of the resid solvent in coprocessing with finely divided catalysts. Quarterly report, July–September, 1994, 20:7129 (R;US)

COAL LIQUIDS
A characterization and evaluation of coal liquefaction process streams. Quarterly technical progress report, June 29–September 30, 1994, 20:7138 (R;US)
Molecular catalytic coal liquid conversion. Quarterly progress report, 20:7130 (R;US)
Refining and end use of coal liquids. Quarterly report, April–June 1994, 20:7123 (R;US)

COAL MINING
The future of brown coal mining in Germany. Lectures, 20:7187 (I;DE;In German)

COAL PREPARATION
Development of a coal quality expert. Technical progress report No. 16, 20:7630 (R;US)
Electrostatic beneficiation of coal. Quarterly technical progress report, July 1, 1994–September 30, 1994, 20:7099 (R;US)
Refining of fossil resin flotation concentrate from western coal. Seventh quarter final report, July 1, 1994–September 30, 1994, 20:7146 (R;US)

COAL-DERIVED GASES
See COAL GAS

COAL-DERIVED LIQUIDS
See COAL LIQUIDS

COAL-FIRED GAS TURBINES
Sonic enhanced ash agglomeration and sulfur capture. Technical progress report, July 1994–September 1994, 20:7152 (R;US)

COAL-OIL MIXTURES
See COAL
FUEL OILS
FUEL SLURRIES

COALBED METHANE
See METHANE

COALTEK PROCESS
See FUEL FEEDING SYSTEMS

COASTAL REGIONS
[Circulation and exchange processes on the South Atlantic Bight Continental Shelf]. [Progress summary for 1986], 20:8524 (R;US)

COBALT
Ion exchange of Cobalt and Cadmium in Zeolite X., 20:8165 (I;MX;In Spanish)
The evaluation of cobalt data for 10^{-5} eV to 20 MeV neutrons, 20:8887 (RA;CN)

COBALT 60
Data summary for the near-shore sediment characterization task of the Clinch River Environmental Restoration Program, 20:7483 (R;US)

Soil treatment to remove uranium and related mixed radioactive heavy metal contaminants. Seventh quarterly technical progress report, July 1, 1994–September 30, 1994, 20:8470 (R;US)
Sorption of radioactive Cobalt by sepiolite., 20:8216 (IA;MX)
Sorption of radioactive cobalt with sepiolite and erionite., 20:8217 (I;MX;In Spanish)

COBALT 61
Nuclear data sheets update for A = 61, 20:8851 (RA;CN)

COBALT BASE ALLOYS
Changes ib structure and properties of amorphous metallic alloys under ion irradiation, 20:8090 (IA;RU;In Russian)

COBALT COMPOUNDS
Cesium cobaltdicarbollide-solubility, precipitation, and reactivity in basic aqueous solution, 20:7433 (R;US)

CODONS
Deriving non-homogeneous Markov chain models from the multiple alignment with the entropy criteria, 20:8574 (RA;US)

COESITE
See SILICON OXIDES

COGENERATION
Market conditions for wind power and biofuel-based cogeneration, 20:7561 (R;SE;In Swedish)

COGENERATION PLANTS
See DUAL-PURPOSE POWER PLANTS

COHERENT RADIATION
Generalized Van Cittert Zernike theorem in curved space time, 20:8664 (RA;IL)
The Wolf effect in spherically symmetric systems, 20:8665 (RA;IL)

COHERENT SCATTERING
Coherent Dissociation $^{12}C \rightarrow 3\alpha$ in Emulsion Enriched by Pb, 20:8935 (R;XJ;In Russian)

COIL PROCESS
See COAL LIQUEFACTION

COKE-OVEN GAS
See COAL GAS

COLD FUSION
Data acquisition system for a deuteration chamber., 20:9052 (I;MX;In Spanish)

COLD STORAGE
Outdoor air and groundwater as natural sources for cooling, 20:8000 (RA;US)

COLIFORMS
Coliform bacteria as in indicator of sewerage water mixing with drinking water sources in Rawalpindi city, 20:8545 (R;PK)

COLLEGES
See EDUCATIONAL FACILITIES

COLLOIDS
See also GELS
Adiabatic pair potential for charged particulates in plasma and electrolytes, 20:8692 (RA;IL)
Design of supramolecular ordered systems for mesoscopic colloids and molecular composites. Progress report, November 10, 1993–June 10, 1994, 20:8138 (R;US)
Investigation of Fe_3O_4 Colloid Behaviour in a Magnetic Field by Polarized Neutron Transmission, 20:8987 (R;XJ)
Temperature and dose dependence of metal colloid production in alpha-irradiated CaF_2, 20:8144 (R;US)

COLOGNE SPIRITS
See ETHANOL

COLOR MODEL
SO(8) colour as possible origin of generations, 20:8713 (R;RU)

COLUMBIA RIVER
Movements of white sturgeon in Lake Roosevelt. Final report, 1988–1991, 20:7578 (R;US)
Screening analysis, volume 1 description and conclusions, August 1992, 20:7574 (R;US)
Significance of selective predation and development of prey protection measures for juvenile salmonids in the Columbia and Snake River Reservoirs. Annual report, February 1992–February 1993, 20:7577 (R;US)

COLUMBIA RIVER BASIN
Ecosystem diagnosis and treatment planning model as applied to supplementation. Model description, user guide, and theoretical documentation for the model introduce in the summary report series on supplementation in the Columbia basin, 20:8523 (R;US)
Umatilla hatchery monitoring and evaluation. Annual report 1993, September 1, 1992–October 30, 1993, 20:7576 (R;US)

COLUMBIUM
See NIOBIUM

COLUMNS (EXTRACTION)
See EXTRACTION COLUMNS

COLUMNS (MECHANICAL)
See MECHANICAL STRUCTURES

COMBINED GAS AND STEAM CYCLE POWER PLANTS
See COMBINED-CYCLE POWER PLANTS

COMBINED STEAM-POWER GENERATION
See COGENERATION

COMBINED-CYCLE POWER PLANTS
Experts' opinion: Heat exchangers in power plant engineering. Pt. 1. Enhanced efficiency through the further development of heat exchanger technologies, 20:7631 (I;DE;In German)
SYNCHEM feasibility report: Phase 1, 20:7628 (R;US)
Tampa Electric Company Polk Power Station Unit Number 1. Annual report, January–December, 1993, 20:7629 (R;US)
Usability of catalytic gas cleaning in a simplified IGCC power system. Deactivation of Ni/Al_2O_3 catalysts. Literature review, 20:7640 (R;FI)

COMBUSTION
See also FLUIDIZED-BED COMBUSTION
IN-SITU COMBUSTION
SPONTANEOUS COMBUSTION
A higher-order projection method for the simulation of unsteady turbulent nonpremixed combustion in an industrial burner, 20:8220 (R;US)

COMBUSTION CHAMBERS
Particulate behavior in a controlled-profile pulverized coal-fired reactor: A study of coupled turbulent particle dispersion and thermal radiation transport. Quarterly technical progress report, June 15–September 14, 1994, 20:7173 (R;US)

COMBUSTION PRODUCTS
See also ASHES
Coolside waste management research. Quarterly report, July 1, 1994–September 30, 1994, 20:7633 (R;US)
Sonic enhanced ash agglomeration and sulfur capture. Technical progress report, July 1994–September 1994, 20:7152 (R;US)

COMBUSTORS
See also FLUIDIZED-BED COMBUSTORS
PULSE COMBUSTORS
A coal-fired combustion system for industrial process heating applications. Quarterly technical progress report, April 1994–June 1994, 20:7172 (R;US)
High performance materials in coal conversion utilization. Technical progress report, July 1–September 30, 1994, 20:8140 (R;US)

COMMERCIAL BUILDINGS
Daylighting in business buildings. State report, 20:7985 (R;DK;In Danish)
Description of electric energy use in commercial buildings in the Pacific Northwest: 1992 Supplement. End-use Load and Consumer Assessment Program (ELCAP), 20:8018 (R;US)
MF-demonstration project at Wewer's Brickyard in Helsinge, 20:7601 (R;DK)
Part I - Oil heat technology research and development. Part II - NAECA 2002, what, when, and who?, 20:7947 (RA;US)
Possible future directions for extruded polystyrene foam insulation, 20:7987 (RA;US)
The design and evaluation of integrated envelope and lighting control strategies for commercial buildings, 20:7981 (R;US)

COMMUNITIES (ECOLOGICAL)
See ECOSYSTEMS

COMPOSITE MATERIALS
See also CERMETS
FIBERGLASS

High performance materials in coal conversion utilization. Technical progress report, July 1–September 30, 1994, 20:8140 (R;US)
Investigation of properties and performance of ceramic composite components. Final report on Phase 2, 20:8143 (R;US)
NMR study of nanophase Al/Al-oxide powder and consolidated composites, 20:8136 (R;US)
Optical properties of fractal nanocomposites, 20:8980 (R;US)
Strength and elastic properties of some graphites, carbon/carbon and SiC/SiC composite materials, 20:8142 (R;DE;In German)
Wear resistant composite structure of vitreous carbon containing convoluted fibers, 20:8137 (R;US)

COMPOUNDS (ORGANIC)
See ORGANIC COMPOUNDS

COMPRESSED GASES
Study on the CNG storage method using activated adsorbent and CNG combustion technology for vehicles, 20:8012 (R;KR;In Korean)

COMPRESSIBLE FLOW
Implementation of a parallel algorithm for thermo-chemical nonequilibrium flow simulations, 20:8256 (R;US)

COMPRESSORS
Work plan for upgrading the 241-A-701 compressed air system and motor control center. Revision 1, 20:7423 (R;US)

COMPTON EFFECT
On the Compton Twist-3 Asymmetries, 20:8762 (R;XJ)

COMPTON SCATTERING
See COMPTON EFFECT

COMPUTER CODES
See also G CODES
S CODES
V CODES
W CODES
Implementation of a parallel algorithm for thermo-chemical nonequilibrium flow simulations, 20:8256 (R;US)
Lawrence Livermore pulsed sphere benchmark analysis of MCNP™ ENDF/B-VI, 20:8949 (R;US)

COMPUTER NETWORKS
Adventures in the evolution of a high-bandwidth network for central servers, 20:9187 (R;US)
Dynamics of TCP traffic over ATM networks, 20:9179 (R;US)
Final report and recommendations of the ESnet Authentication Pilot Project, 20:9184 (R;US)
Wide-area traffic: The failure of Poisson modeling, 20:9180 (R;US)

COMPUTER PROGRAMS
See COMPUTER CODES

COMPUTERIZED CONTROL SYSTEMS
DACS upgrade acceptance test report, 20:7394 (R;US)
Experience of reliability of programmable control systems, 20:7632 (R;FI;In Finnish)
NSLS control system upgrade, 20:8311 (R;US)
Operator support systems in nuclear power plants. Proceedings of a specialists meeting held in Moscow, Russian Federation, 17-21 May 1993, 20:7709 (R;XA)

COMPUTERIZED SIMULATION
A Study on energy oriented intelligent building system(II) - development of emulator/tester, 20:7975 (R;KR;In Korean)
Computer Simulation of Accelerator Beam Extraction with a Bent Crystal, 20:8323 (R;XJ)
Object-oriented parallel polygon rendering, 20:9186 (R;US)
Simulation with complex measures, 20:8774 (R;AU)

COMPUTERS
See also HYPERCUBE COMPUTERS
IBM COMPUTERS
Computer software review procedures, 20:7738 (RA;XA)

CONCRETES
Diffusion of volatile organic components through concrete floors, 20:8504 (RA;DK;In Danish)

CONDENSATION NUCLEI
On the detection efficiency of ultrafine CNC at 1-3 nm size range, 20:8446 (RA;FI)

CONDENSED CYCLOALKANES
See CYCLOALKANES

CONDENSERS (ELECTRIC)
See CAPACITORS

CONDENSERS (STEAM)
See STEAM CONDENSERS

CONDIMENTS
See FOOD

CONOCO GASIFICATION PROCESS
See COAL GASIFICATION

CONSERVATION (ENERGY)
See ENERGY CONSERVATION

CONSOL SYNTHETIC FUEL PROCESS
See COAL LIQUEFACTION

CONTACTORS
See SWITCHES

CONTAINED EXPLOSIONS
HAZEBROOK, containment data report, 20:8427 (R;US)
KERNVILLE, containment data report, 20:8426 (R;US)

CONTAINERS
See also CASKS
PRESSURE VESSELS
REACTOR VESSELS
TANKS
Application of artificial neural networks for modeling localized corrosion, 20:8229 (RA;XA)
K Basin spent fuel sludge treatment alternatives study. Volume 1, Regulatory options, 20:7343 (R;US)
K Basin spent fuel sludge treatment alternatives study. Volume 2, Technical options, 20:7344 (R;US)
Test and evaluation report, U.S. Department of Transportation Specification 7A Type A radioactive material packaging, WHC Solid Sample Package (unshielded) (3M SafeSend® Reusable Super Pack Shipping System [SP-R1L Kit]), 20:8248 (R;US)
Test plan for a U.S. Department of Transportation Specification 7A Type A radioactive material packaging, WHC Liquid Sample Package (unshielded) (3M SafeSend® Reusable Super Pack Shipping System [SP-R1L Kit]), 20:8247 (R;US)

CONTAINMENT
See also CONTAINMENT SYSTEMS
Application of the CONTAIN code to LWRs, 20:7811 (RA;DE;In German)
Containment concepts and load carrying capacity, 20:7810 (RA;DE)
Thermo-hydraulic investigations on passive containment cooling, 20:7809 (RA;DE;In German)

CONTAINMENT SYSTEMS
CONTAIN independent peer review, 20:7817 (R;US)
Evaluation of the effectiveness of the sealed double-ringed infiltrometers and the effects of changes in atmospheric pressure on hydraulic conductivity, 20:7438 (R;US)
Stakeholder involvement report for the Cryocell® demonstration at Hanford, 20:7864 (R;US)

CONTAMINATION
See also INDOOR AIR CONTAMINATION
Sampling and analysis of soil from the old F-Area effluent ditch and its surrounding wetlands, 20:7435 (R;US)
WAG 2 remedial investigation and site investigation site-specific work plan/health and safety checklist for the ecological assessment task, Kingfisher Study, 20:7482 (R;US)

CONTENT ANALYSIS
See CHEMICAL ANALYSIS

CONTRACTORS
Audit of administration of the Department of Energy's small disadvantaged business program, 20:9130 (R;US)
Implementing the theories: A fully integrated project control system that's implemented and works, 20:9132 (R;US)

CONTRACTS
Forecast of Contracting and Subcontracting Opportunities, Fiscal year 1995, 20:7870 (R;US)

CONTROL (RADIOACTIVITY)
See RADIATION MONITORING

CONTROL ELEMENTS
Cadmium Control and Safety Rod Disposal at the Savannah River Site, 20:7426 (R;US)

CONTROL EQUIPMENT
See also ELECTRIC CONTROLLERS
Domestic production of control parts for the nuclear waste treatment facility, 20:8390 (R;KR;In Korean)
CONTROL RODS
See CONTROL ELEMENTS
CONTROL ROOMS
Basic principles of providing operator information support for power plant control of the VPBER-600 reactor plant, 20:7731 (RA;XA)
The SPDS as a tool to improve post-accident strategy on WWER and RBMK reactors, 20:7719 (RA;XA)
Use of interview and inquiry procedures in design process for NPP control room upgrade, 20:7733 (RA;XA)
Westinghouse computer-based operator support systems, 20:7710 (RA;XA)
Work plan for upgrading the 241-A-701 compressed air system and motor control center. Revision 1, 20:7423 (R;US)
CONVECTION
Cryogenic helium gas convection research, 20:8250 (R;US)
CONVERTOL PROCESS
See COAL PREPARATION
COOLANTS
A study on the safety measures of LMR coolant -Liquid metal reactor development-, 20:7678 (R;KR;In Korean)
COOLERS
See HEAT EXCHANGERS
COOLING
See also DISTRICT COOLING
A study on retrofit measures of KIER buildings for energy conservation, 20:7967 (R;KR;In Korean)
COOLING SYSTEMS
Development of advanced low-temperature heat transfer fluids for district heating and cooling, final report, 20:8249 (R;US)
Thermal-hydraulic characteristics of safety systems in advanced reactors Part 1. Heat transfer in passive containment cooling system. Part 2. Fluid mixing with safety injection, 20:7690 (R;KR;In Korean)
COOLING TOWERS
Site selection of meteorological tower and environmental impact assessment of the cooling tower, 20:7754 (R;KR;In Korean)
COPOLYMERS
Design of supramolecular ordered systems for mesoscopic colloids and molecular composites. Progress report, November 10, 1993–June 10, 1994, 20:8138 (R;US)
Responsive copolymers for enhanced petroleum recovery. Quarterly technical progress report, June 23–September 21, 1994, 20:8180 (R;US)
COPPER
Calculation of transmutation in copper and comparison with measured electrical properties, 20:8105 (R;US)
Carbon monoxide oxidation over three different states of copper: Development of a model metal oxide catalyst, 20:8063 (R;US)
Direct catalytic decomposition of nitric oxide. Quarterly technical progress report number 12, July–September, 1994, 20:8436 (R;US)
Negative binomial fits to multiplicity distributions from central collisions of ^{16}O + Cu at 14.6A GeV/c and intermittency, 20:8880 (R;US)
PEP-II vacuum system - joining SS flanges to copper beam chambers, 20:8327 (R;US)
Photon stimulated desorption (PSD) measurements of extruded copper and of welded copper beam chambers for the PEP II asymmetric B-factory, 20:8333 (R;US)
Synergistic effect of helium and hydrogen on copper single crystal, 20:9099 (RA;IL)
COPPER 61
Nuclear data sheets update for A = 61, 20:8851 (RA;CN)
COPPER 63
The (γ, γ')-experiment at the injection for the Moscow racetrack microtron, 20:8921 (IA;RU)
COPPER 63 TARGET
Calculation of transmutation in copper and comparison with measured electrical properties, 20:8105 (R;US)
COPPER 65 REACTIONS
Calculation of transmutation in copper and comparison with measured electrical properties, 20:8105 (R;US)
COPPER ALLOYS
See also COPPER BASE ALLOYS
Calculation of transmutation in copper and comparison with measured electrical properties, 20:8105 (R;US)
The influence of preferred crystallographic orientation on blister size distribution in helium implanted surfaces, 20:8086 (RA;IL)
COPPER BASE ALLOYS
Blister model based on near-surface helium concentration on implanted metals, 20:8085 (RA;IL)
COPPER OXIDES
Carbon monoxide oxidation over three different states of copper: Development of a model metal oxide catalyst, 20:8063 (R;US)
Characterization of superconducting thin films by rutherford backscattering analysis, 20:8985 (IA;IR;In English, Persian)
Cooling rate effects on the microstructure, critical current density, and T_c transition of one- and two-powder BSCCO-2223 Ag-sheathed tapes, 20:8115 (R;US)
Cross-flow, filter-sorbent-catalyst for particulate, SO_2 and NO_x control. Final report, 20:7171 (R;US)
Device-quality tunnel junctions on the high T_c superconductor $HgBa_2CuO_{4+\delta}$, 20:8117 (R;US)
Effects of Bi and Bi_2O_3 additions on the microstructure and superconducting properties of powder-in-tube BSCCO (2212) tapes, 20:8113 (R;US)
Microstructure and composition of a SNS Josephson junction using $CaRuO_3$ as the metallic barrier, 20:9026 (R;US)
Oxygen stoichiometry and its influence on superconductivity in $Bi_2Sr_2CaCu_2O_{8+x}$, 20:8114 (R;US)
Processing of single- and multi-domain $YBa_2Cu_3O_x$ bulk materials for levitation applications by $Nd_{1+x}Ba_{2-x}Cu_3O_y$ seeding, 20:8118 (R;US)
Solution based synthesis of perovskite-type oxide films and powders, 20:8127 (R;US)
The real structure of columnar pinning centers in heavy-ion-irradiated cuprate superconductors, 20:8119 (R;US)
Zone refining of sintered, microwave-derived YBCO superconductors, 20:8116 (R;US)
CORE CATCHERS
Studies of core catcher concepts, 20:7806 (RA;DE;In German)
The COMET concept, 20:7807 (RA;DE;In German)
CORES (DRILL)
See DRILL CORES
CORES (REACTOR)
See REACTOR CORES
CORIUM
Molten core cooling systems for future PWR plants, 20:7797 (RA;DE;In German)
CORN (MAIZE)
See MAIZE
CORN STOVER
See MAIZE
CORROSION RESISTANCE
Application of artificial neural networks for modeling localized corrosion, 20:8229 (RA;XA)
COSMIC PARTICLES
See COSMIC RADIATION
COSMIC RADIATION
Important plasma problems in astrophysics, 20:8706 (R;US)
COSMOS
See UNIVERSE
COSORB PROCESS
See CARBON MONOXIDE
COUNTERFLOW COOLING TOWERS
See COOLING TOWERS
COUNTERS (RADIATION)
See RADIATION DETECTORS
COUNTY BUILDINGS
See PUBLIC BUILDINGS
COURT BUILDINGS
See PUBLIC BUILDINGS

CP INVARIANCE
CP violation tests for tau/top processes, 20:8714 (R;US)
CP violation tests for top/tau processes, 20:8716 (R;US)
Production of polarized τ pairs and tests of CP violation using polarized $e^{\pm}$ colliders near threshold, 20:8738 (R;US)
Tau as a probe for new physics, 20:8783 (R;US)
Tests for leptonic CP violation in tau decays, 20:8717 (R;US)

CPU-400 COMBUSTION PLANT
See WASTE PROCESSING PLANTS

CRACKS
Crack closure - an experimental study, 20:8109 (R;SE;In Swedish)
Development of detection technique for fatigue crack due to thermal stratification phenomena in RCS piping, 20:7660 (R;KR;In Korean)

CRAFTSMEN
Oil heat technology - efficiency training manual, 20:7948 (RA;US)

CRANES
Level 1: Incidental crane operator's and incidental rigger's manual. Revision, 20:7480 (R;US)

CRITICAL ASSEMBLIES
See ZERO POWER REACTORS

CRITICALITY
Criticality accidents and simplified estimation of total fission number, 20:7276 (RA;XA)

CRITICALITY ACCIDENTS
See CRITICALITY
RADIATION ACCIDENTS

CROPS
Develop a field grid system for yield mapping and machine control. Quarterly report, October 1–December 31, 1994, 20:8598 (R;US)
Estimated effects of radioactive fallout on agricultural production in Sweden. Contamination of crop products, 20:8634 (R;SE;In Swedish)

CROSSFLOW COOLING TOWERS
See COOLING TOWERS

CRUDE OIL
See PETROLEUM

CRYSTAL GROWTH
Synthesis of carbo-nitride films using high-energy shock plasma deposition, 20:8134 (R;AU)

CRYSTAL LATTICES
The one-dimensional model of the off-centre potential of the fluorine ion in the NaBr lattice, 20:8978 (R;XA)

CRYSTAL PHASE TRANSITIONS
See CRYSTAL-PHASE TRANSFORMATIONS

CRYSTAL RIVER
See RIVERS

CRYSTAL STRUCTURE
See also CRYSTAL LATTICES
Polarisation resonance in X-ray diffraction, 20:8990 (R;AU)

CRYSTAL-PHASE TRANSFORMATIONS
Crystal defect kritical concentration under crystal-amorphous state transformation of semiconductor materials, 20:8997 (IA;RU;In Russian)

CRYSTALS
See also LIQUID CRYSTALS
POLYCRYSTALS
Crystallite size distribution in the synthesis of γ - $LiAlO_2$, 20:8187 (IA;MX)
Effect of high energy ions on radiation-induced defects in crystals, 20:8999 (IA;RU;In Russian)
Phonon-induced anomalous specific heat of a model nanocrystal by computer simulation, 20:8971 (R;US)

CSF PROCESS
See COAL LIQUEFACTION

CSIRO PROCESS
See COAL GASIFICATION

CURIUM 248
The Inclusive Energy Spectra of Light Charged Particles (p, d, t, ^{4}He) from Spontaneous Fission of ^{248}Cm, 20:8915 (RA;XJ;In Russian)

CURRENT DENSITY
Current distributions in superconducting wires subject to a random orientation magnetic field, and corresponding to the Tokamak usual conditions, 20:9033 (R;FR;In French)

CYAM PROCESS
See WASTE PROCESSING

CYANIDES
Correlations between CN and SO_2 concentrations at Vaerrioe research station, 20:8444 (RA;FI)

CYCLES (THERMODYNAMIC)
See THERMODYNAMIC CYCLES

CYCLOALKANES
Advanced thermally stable jet fuels. Technical progress report, January 1994–March 1994, 20:7247 (R;US)

CYCLOTRONS
See also MICROTRONS
A study on the irradiation effect on reactor materials using a cyclotron, 20:8263 (R;KR;In Korean)
A study on the proton beam energy measurement and diagnosis, 20:8325 (R;KR;In Korean)

CYLINDERS
Dynamic modeling and response of rigid embedded cylinders, 20:8225 (R;US)

CZECH REPUBLIC
SYNCHEM feasibility report: Phase 1, 20:7628 (R;US)
Wind energy market study Eastern Europe. Czech and Slovak Republics, 20:7609 (R;DK)

CZECHOSLOVAKIA
See CZECH REPUBLIC
SLOVAKIA

D

D MESONS
Probing new physics in rare charm processes, 20:8818 (R;US)

D PLUS RESONANCES
See D MESONS

D-1865 RESONANCES
See D MESONS

DAHOMEY
See AFRICA

DAIRY INDUSTRY
Methane recovery from animal manures: A current opportunities casebook, 20:7552 (R;US)

DAMS
Blue Creek Winter Range: Wildlife Mitigation Project. Final environmental assessment, 20:7579 (R;US)
Chinese-Finnish cooperative research work on dam break hydrodynamics, 20:7582 (RA;FI)
Investigation report of dam safety research in China, 20:7581 (RA;FI)
Investigation report of dam safety research in China. Report of hydraulic models, 20:7580 (R;FI)
Movements of white sturgeon in Lake Roosevelt. Final report, 1988–1991, 20:7578 (R;US)
Seismic analysis of the Par Pond Dam: Study of slope failure and liquefaction. Technical evaluation report, 20:8646 (R;US)

DANISH ORGANIZATIONS
See also RISOE NATIONAL LABORATORY
Energy saving consultancy and training in Latvia. Final report for phases C1, D and E1 with an update for phases A and B, 20:7889 (R;DK)

DANNY BOY EVENT
See NUCLEAR EXPLOSIONS

DATA
Standardization of direct and global solar radiation in Korea (II), 20:7966 (R;KR;In Korean)

DATA ACQUISITION
Report of the international workshop on quality control of monthly climate data, 20:9194 (R;US)

DATA ACQUISITION SYSTEMS
Combustion of pulverized coal in vortex structures. Quarterly progress report number 4, July 1–September 30, 1994, 20:7177 (R;US)
DACS upgrade acceptance test report, 20:7394 (R;US)
Data acquisition system for a deuteration chamber., 20:9052 (I;MX;In Spanish)
New informative techniques in high energy physics, 20:9164 (R;RU;In Russian)
Prototype of fronted electronics for tracking detectors with high channel density, 20:8367 (R;RU;In Russian)
DATA ANALYSIS
A Study of the A Dependence of the Deep Inelastic Scattering of Leptons and Implications for Understanding of the EMC Effect, 20:8796 (R;XJ)
Alpha spectral analysis via artificial neural networks, 20:7453 (R;US)
DATA BASE MANAGEMENT
Overview of selected molecular biological databases, 20:8553 (R;US)
DATA COVARIANCES
Covariance data evaluation for experimental data, 20:9158 (RA;CN)
DATA DISPLAY DEVICES
See DISPLAY DEVICES
DATA DISPLAY SYSTEMS
See DISPLAY DEVICES
DATA STORAGE DEVICES
See MEMORY DEVICES
DATA TRANSMISSION SYSTEMS
Positioning the electric utility to build information infrastructure, 20:7909 (R;US)
DE BROGLIE WAVELENGTH
Magneto-optical transmission-reflection beam splitter for multilevel atoms, 20:8686 (R;AU)
DE SITTER GROUP
Geometrical and non-geometrical constants of de sitter space-time, 20:8728 (IA;IR;In English, Persian)
DEBRIS (NUCLEAR)
See FISSION PRODUCTS
DECALSO
See ION EXCHANGE MATERIALS
DECAY HEAT REMOVAL
See AFTER-HEAT REMOVAL
DECISION MAKING
Environmental problems and attitudes towards risk and uncertainty, 20:7896 (RA;CH)
DECONTAMINATION
Reduction of phenols, detergents and coliform bacteria in samples of waste water by gamma radiation processing., 20:8208 (IA;MX)
DECONTAMINATION FACTOR
See DECONTAMINATION
DEER
Chernobyl cesium in the Swedish moose population: Effect of age, diet and habitat selection, 20:8508 (R;SE)
DEGREES OF FREEDOM
A Queer Reduction of Degrees of Freedom, 20:8731 (R;XJ)
DELTA RESONANCES (MESON)
See MESONS
DENMARK
CO_2 taxation in the EU, 20:7846 (I;DK)
Energy consumption in the primary agricultural activities. Branch analysis, 20:8030 (R;DK;In Danish)
Energy consumption in the primary agricultural activities. Branch analysis, 20:8029 (R;DK;In Danish)
Estimate of resources from wastes in Denmark, 20:7868 (R;DK;In Danish)
Organic micro-pollutions in ground water resources, cleaning and water usage, 20:8501 (RA;DK;In Danish)
DENSITOMETERS
Development of Liquid Level and Density Bubbler for DWPF Canyon Vessels. Final report, 20:7439 (R;US)
DEOXYPENTOSE NUCLEIC ACID
See DNA
DEOXYRIBONUCLEIC ACID
See DNA
DEPARTMENT OF DEFENSE
See US DOD
DEPARTMENT OF TRANSPORTATION
See US DOT
DEPLETION (ISOTOPIC)
See ISOTOPE SEPARATION
DESERTRON
See SUPERCONDUCTING SUPER COLLIDER
DESOXYRIBONUCLEIC ACID
See DNA
DETECTION (NUCLEAR EXPLOSIONS)
See NUCLEAR EXPLOSION DETECTION
DETECTION (RADIATION)
See RADIATION DETECTION
DETECTORS (RADIATION)
See RADIATION DETECTORS
DETERGENTS
X-ray photoelectron spectroscopy analysis of cleaning procedures for synchrotron radiation beamline materials at the Advanced Photon Source, 20:8332 (R;US)
DEUTERIUM
Quantum mechanical cross sections for $D+H_2$ and $H+D_2$ reactive systems. Application of the negative imagnibnary potentials within the j_Z approximation, 20:8184 (RA;IL)
DEUTERIUM OXIDE
See HEAVY WATER
DEUTERIUM-LITHIUM HIGH FLUX NEUTRON SOURCE FACILITY
See NEUTRON SOURCE FACILITIES
DEUTERON BEAMS
JINR rapid communications. Collection 6, 20:8860 (R;XJ;In English, Russian)
DEUTERON REACTIONS
Polarization Observables for the Collinear $dp \rightarrow {}^3He\pi^0$ Reaction, 20:8927 (R;XJ)
Progress on the evaluation of charged particle nuclear reaction data in Sichuan University, 20:8905 (RA;CN)
DEUTERON-DEUTERON INTERACTIONS
See DEUTERON REACTIONS
DEUTERONS
JINR rapid communications. Collection 6, 20:8860 (R;XJ;In English, Russian)
DEVICES
See EQUIPMENT
DIABLO CANYON-1 REACTOR
Team interaction skills evaluation criteria for nuclear power plant control room operators, 20:7752 (R;US)
DIABLO CANYON-2 REACTOR
Team interaction skills evaluation criteria for nuclear power plant control room operators, 20:7752 (R;US)
DIAGNOSTIC TECHNIQUES
A model based diagnostic system for the identification of malfunctioning components using a constraint propagation paradigm, 20:7728 (RA;XA)
Nuclear power plant diagnostics using artificial neural networks, 20:7747 (RA;XA)
DIAMONDS
A photoemission study of the diamond and the single crystal C_{60}, 20:8150 (R;US)
Polarized Raman spectroscopy of chemically vapour deposited diamond films, 20:9014 (R;AU)
DICHROISM
Effects of chain orientation on the radiation response of atactic polystyrene., 20:8209 (IA;MX)
DICHROMATES
Heterogeneous catalytic process for alcohol fuels from syngas. Tenth quarterly technical progress report, April 1994–June 1994, 20:7566 (R;US)
DIES
Apparatus for restraining and transporting dies, 20:8242 (PA;US)

DIESEL ENGINES
Advanced Diesel Engine Component Development Program, final report - tasks 4-14, 20:8056 (R;US)
Impact of combustion chamber geometry on charge stratification in a CNG fueled direct injection Otto engine, 20:8058 (R;SE)
Improvements in heavy oil fuel systems for marine diesel engines, 20:8057 (R;DE;In German)
DIESEL FUELS
SOFC development for logistics fuel applications, 20:7937 (RA;US)
DIESEL MOTORS
See DIESEL ENGINES
DIESEL OIL (FRACTION)
See DIESEL FUELS
DIFFRACTION (ELECTRON)
See ELECTRON DIFFRACTION
DIFFRACTION (X-RAY)
See X-RAY DIFFRACTION
DIGESTER GAS
See METHANE
DIMETHYL KETONE
See ACETONE
DIMETHYL SULFOXIDE
See DMSO
DINING CAR EVENT
See NUCLEAR EXPLOSIONS
UNDERGROUND EXPLOSIONS
DIPROTONS
JINR rapid communications. Collection 5, 20:7685 (R;XJ;In English, Russian)
DIRAC EQUATION
The Foldy-Wouthuysen transformation, 20:8751 (R;AU)
DIRECT CONTACT HEAT EXCHANGERS
Development of Direct Contact Heat Exchangers for solar energy utilization (III), 20:7968 (R;KR;In Korean)
DISASTERS
Global warming damage and the risk of a climate catastrophe, 20:7892 (RA;CH)
DISINTEGRATION (FISSION)
See FISSION
DISPERSANTS (CHEMICAL)
See SURFACTANTS
DISPERSION NUCLEAR FUELS
Postirradiation examination of a low enriched U_3Si_2-Al fuel element manufactured and irradiated at Batan, Indonesia, 20:7762 (R;US)
Radiological effects of an aircraft crash into the BER II research reactor. Comparison of effects for HEU and LEU fuels, 20:7785 (R;DE;In German)
DISPLACEMENT FLUIDS
Improving reservoir conformance using gelled polymer systems. Quarterly progress report, July 1–September 30, 1994, 20:7207 (R;US)
Quantitation of microbial products and their effectiveness in enhanced oil recovery. Final report, 20:7199 (R;US)
DISPLAY DEVICES
Functional design bases for a safety parameter display system for WWER-type reactors, 20:7721 (RA;XA)
DISSOLVED OXYGEN
See OXYGEN
DISTILLATE FUEL
See HEATING OILS
DISTILLATE FUEL OIL
See HEATING OILS
DISTORTED WAVE BORN APPROXIMATION
See DWBA
DISTRICT COOLING
City of New Orleans Ammonia District Cooling Plant. Final report, 20:8043 (R;US)
DISTRICT HEATING
About the influence on the heat load from net structure and operating strategy for a DH-network, 20:8054 (RA;SE)
District heating. Research summary 1988-1993, 20:8053 (RA;SE)
Energy dense water, 20:8050 (R;SE)
Increased energy capacity in district heating fluids, 20:8051 (RA;SE)
The MBB-Vacuum Super Insulation (VSI), 20:7989 (RA;US)
DISUSED MINESHAFTS
See ABANDONED SHAFTS
DMSO
Hydrolysis of plutonium: Corrosion kinetics in DMSO solutions containing simulated high explosive and water, 20:8421 (R;US)
DNA
Bifurcations and chaos of DNA solitonic dynamics, 20:8697 (R;XA)
Radiation-induced electron migration along DNA, 20:8632 (R;US)
Syntheses of nucleic acid and protein in somatic embryos of Fritillaria ussuriensis maxim in different development stages, 20:8596 (R;CN)
DNA SEQUENCING
Towards DNA sequencing by hybridization, 20:8563 (RA;US)
DOCUMENT RETRIEVAL
See INFORMATION RETRIEVAL
DOGS
Cellular morphometry and cycling cell populations of human and dog bronchi. Annual progress report, April 1, 1994–March 31, 1995, 20:8612 (R;US)
DOMESTIC WASTES
See MUNICIPAL WASTES
DORMITORIES
See RESIDENTIAL BUILDINGS
DOSEMETERS
Intercomparison of high energy neutron personnel dosimeters, 20:8395 (R;US)
Radiation Monitor (RAM) ION communication with wireless monitoring system, 20:8353 (RA;IL)
Radiation Monitor (RAM) ION pressure response instrument, 20:8352 (RA;IL)
Real-time dosimetry for boron-neutron capture therapy, 20:8593 (R;US)
DOSIMETERS
See DOSEMETERS
DOSIMETRY
See also GAMMA DOSIMETRY
NEUTRON DOSIMETRY
PERSONNEL DOSIMETRY
X-RAY DOSIMETRY
Committee on Interagency Radiation Research and Policy Coordination (CIRRPC), 20:8630 (R;US)
Verification of the MAXIGASP and POPGASP Computer Codes for Environmental Dose Assessment, 20:7460 (R;US)
DOUBLET-3 DEVICE
Evidence for modified transport due to sheared E x B flows in high-temperature plasmas, 20:9049 (R;US)
DOUGLAS POINT SITE
See POWER PLANTS
DOWEX
See ORGANIC ION EXCHANGERS
DRIFT INSTABILITY
Nonlinear instability mechanism in 3-D collisional driftwave turbulence, 20:9054 (R;DE)
DRILL CORES
Core scanning for Th, U and K. Problems and solutions, 20:8469 (R;DK)
DRINKING WATER
P-Area Acid/Caustic Basin groundwater monitoring report, second quarter 1994, 20:7507 (R;US)
DROSOPHILA
Effects of arsenic upon the no-disyuntion and X chromosome loss mechanisms in Drosophila melanogaster., 20:8616 (I;MX;In Spanish)
DRY-TYPE COOLING TOWERS
See COOLING TOWERS
DRYERS
[DELTA T dryer/moisture control system]. Final technical report, 20:8025 (R;US)
DTO
See HEAVY WATER

DUAL-PURPOSE POWER PLANTS
SYNCHEM feasibility report: Phase 1, 20:7628 (R;US)
Simulation of diurnal thermal energy storage systems: Preliminary results, 20:7600 (R;US)
DUCTS
Field measurements of heating efficiency of electric forced-air furnaces in six manufactured homes, 20:7960 (R;US)
Measurement of thermal regain in duct systems located in partially conditioned buffer spaces. Informal report, 20:7959 (R;US)
DWBA
Nuclear Distorted Waves in High-Energy Approximation, 20:8877 (R;XJ)
DYE LASERS
Development of laser technology (Development of the wavelength tuning and the output stabilization technology), 20:8231 (R;KR;In Korean)
The development of laser technology, 20:8702 (R;KR;In Korean)
DYMAC SYSTEM
See NUCLEAR MATERIALS MANAGEMENT
PLUTONIUM
DYNAMIC MATERIALS ACCOUNTABILITY SYSTEM
See NUCLEAR MATERIALS MANAGEMENT
PLUTONIUM
DYNAMICS
Hamiltonian dynamics of the condensed media with spontaneously broken symmetry, 20:9023 (R;XA)
DYSPROSIUM 147
Particle-phonon excitations in valence-neutron and valence-proton nuclei around ^{146}Gd, 20:8866 (R;DE;In German)

E

EARTH PENETRATORS
Cone penetrometer testing at the Hanford Site: Final performance evaluation report, 20:7490 (R;US)
EARTH PLANET
World energy scenarios: the two-kilowatt-society, a plausible future or an illusion, 20:7839 (IA;CH)
EARTHQUAKES
A study of small explosions and earthquakes during 1961–1989 near the Semipalatinsk Test Site, Kazakhstan, 20:8429 (R;US)
ESAA environment for seismic activity analysis, 20:8490 (R;XA)
Structural evaluation of thermocouple probes for 241-AZ-101 waste tank, 20:7385 (R;US)
EBIS
See ELECTRON BEAM ION SOURCES
ECOLOGICAL COMMUNITIES
See ECOSYSTEMS
ECONOMIC DEVELOPMENT
Economic transition FY 1995 Multi-Year Program Plan (MYPP)/Fiscal Year Work Plan (FYWP) WBS 7.4.9, 20:9152 (R;US)
ECONOMIC GROWTH
See ECONOMIC DEVELOPMENT
ECOSYSTEMS
See also AQUATIC ECOSYSTEMS
TERRESTRIAL ECOSYSTEMS
The development of a generic model for assessing the effects of elevated CO_2 on ecosystems. Progress report, September 1, 1987–May 31, 1988, 20:8569 (R;US)
[Generic ecosystem model for assessing the effects of elevated carbon dioxide on ecosystems]. [Annual] report, July 1, 1988–June 30, 1989, 20:8570 (R;US)
EDUCATION
See also TRAINING
Activity report. July 1993 - June 1994, 20:9148 (R;SE)
EDUCATIONAL FACILITIES
See also SCHOOL BUILDINGS
A report: A plan to establish Internet access points at Minority Campus sites for connection to a central computing facility, 20:9163 (R;US)
Budget projections - 1991 through 1996 for research in high energy physics, 20:8782 (R;US)
Budget projections 1988, 1989, and 1990 for research in high energy nuclear physics, 20:8779 (R;US)
Budget projections 1989, 1990, and 1991 for research in high energy nuclear physics, 20:8780 (R;US)
Budget projections 1990, 1991, and 1992 for research in high energy nuclear physics, 20:8781 (R;US)
Center for Molecular Electronics, University of Missouri, St. Louis. Environmental Assessment, 20:8226 (R;US)
EFFLUENTS (CHEMICAL)
See CHEMICAL EFFLUENTS
EFFLUENTS (GASEOUS)
See GASEOUS WASTES
EFFLUENTS (LIQUID)
See LIQUID WASTES
EFFLUENTS (RADIOACTIVE)
See RADIOACTIVE EFFLUENTS
EIGENVALUES
Bounds for departure from normality and the Frobenius norm of matrix eigenvalues, 20:9183 (R;US)
JINR rapid communications. Collection 5, 20:7685 (R;XJ;In English, Russian)
EINSTEIN GRAVITATION THEORY
See GENERAL RELATIVITY THEORY
ELASTIC SCATTERING
See also BHABHA SCATTERING
COMPTON EFFECT
MOTT SCATTERING
POTENTIAL SCATTERING
Determination of scattering amplitudes from differential cross section data by using unitarity conditions, 20:8878 (R;AU)
Elastic scattering cross-sections of 11.4 MeV photons from ^{206,207,208}Pb, ^{209}Bi and ^{181}Ta, 20:8910 (RA;IL)
ELECTRIC APPLIANCES
Evaluation of advanced technologies for residential appliances and residential and commercial lighting, 20:7982 (R;US)
ELECTRIC BATTERIES
See also METAL-METAL OXIDE BATTERIES
METAL-NONMETAL BATTERIES
Lithiated oxides for lithium-ion batteries, 20:7828 (R;US)
Transition metal oxides for rocking-chair cells, 20:7829 (R;US)
ELECTRIC CABLES
Design of a high-temperature superconductor current lead for electric utility SMES, 20:7826 (R;US)
ELECTRIC CONDENSERS
See CAPACITORS
ELECTRIC CONTACTORS
See SWITCHES
ELECTRIC CONTROLLERS
A study on the application of the fuzzy logic controllers (II), 20:7749 (R;KR;In Korean)
ELECTRIC COOPERATIVES
See ELECTRIC UTILITIES
ELECTRIC FURNACES
See also CERAMIC MELTERS
Field measurements of heating efficiency of electric forced-air furnaces in six manufactured homes, 20:7960 (R;US)
ELECTRIC GENERATORS
Wind technology development: Large and small turbines, 20:7620 (R;US)
ELECTRIC MOTORS
Study on energy efficiency standard for clothes washers and promoting the spread of high efficiency motors, 20:8237 (R;KR;In Korean)
ELECTRIC POWER
See also HYDROELECTRIC POWER
Electric power monthly: January 1995, with data for October 1994, 20:7905 (R;US)
Electric sales and revenue: 1993, 20:7907 (R;US)
Use of Power? EPIK - Energy Problems in Wartime, 20:7887 (R;SE;In Swedish)
ELECTRIC POWER INDUSTRY
APEX user's guide - (Argonne production, expansion, and exchange model for electrical systems), version 3.0, 20:7904 (R;US)

Bayernwerk AG und -Konzern. Report on the 72nd business year from October 1, 1991 to September 30, 1992, 20:7910 (I;DE;In German)
Performance issues for a changing electric power industry, 20:7908 (R;US)

ELECTRIC SWITCHES
See SWITCHES

ELECTRIC UTILITIES
Bayernwerk AG und -Konzern. Report on the 72nd business year from October 1, 1991 to September 30, 1992, 20:7910 (I;DE;In German)
Electric sales and revenue: 1993, 20:7907 (R;US)
Financial statistics of major U.S. investor-owned electric utilities 1993, 20:7906 (R;US)
Issues and methods in incorporating environmental externalities into the integrated resource planning process, 20:7863 (R;US)
Performance issues for a changing electric power industry, 20:7908 (R;US)
Positioning the electric utility to build information infrastructure, 20:7909 (R;US)
Progress in the standardization of DSM terminology, reporting formats, and evaluation protocols, 20:7912 (R;US)

ELECTRIC-POWERED VEHICLES
See also HYBRID ELECTRIC-POWERED VEHICLES
Basic study on high performance secondary battery for electric load-leveling & electric vehicle, 20:7830 (R;KR;In Korean)
Methods of valuing air pollution and estimated monetary values of air pollutants in various U.S. regions, 20:7849 (R;US)
Phosphoric acid fuel cell for buses, 20:8061 (RA;US)
Proton exchange membrane fuel cell for transportation, 20:8060 (RA;US)
Thermal modeling of the lithium/polymer battery, 20:7831 (R;US)

ELECTRICAL EQUIPMENT
See also CAPACITORS
ELECTROMAGNETS
LIGHTNING ARRESTERS
SWITCHES
Practical superconductor development for electrical power applications, annual report for FY 1994, 20:8268 (R;US)

ELECTRICAL PROPERTIES
The effects of H^+ implants on $YBa_2Cu_3O_7$ superconducting materials, 20:9028 (R;CN;In Chinese)

ELECTRICAL SURVEYS
An approximate inversion method of geoelectrical sounding data using linear and bayesian statistical approaches. Examples of Tritrivakely volcanic lake and Mahitsy area (central part of Madagascar), 20:8489 (R;XA)

ELECTRO-OPTICAL EFFECTS
Linear optocoupler, 20:8274 (PA;US)

ELECTRODES
See also CATHODES
Macrocyclic redox promoters for direct methanol fuel cells, 20:7932 (RA;US)

ELECTROLYTES
See also SOLID ELECTROLYTES
A chemical model for the major electrolyte components of the Hanford waste tanks. The binary electrolytes in the system: $Na\text{-}NO_3\text{-}NO_2\text{-}SO_4\text{-}CO_3\text{-}F\text{-}PO_4\text{-}OH\text{-}Al(OH)_4\text{-}H_2O$, 20:7348 (R;US)

ELECTROMAGNETIC FIELDS
The Interaction of Magnetizations with an External Electromagnetic Field and a Time-Dependent Magnetic Aharonov-Bohm Effect, 20:8733 (R;XJ)

ELECTROMAGNETIC FORM FACTORS
On Explanation of Proton Electromagnetic Form Factor Near p anti p-Threshold from the PS-170 Experiment, 20:8802 (R;XJ;In Russian)

ELECTROMAGNETIC INTERACTIONS
See also COMPTON EFFECT
New Tensor Interaction and the K_L -K_S Mass Difference, 20:8765 (R;XJ)

ELECTROMAGNETIC RADIATION
See also COHERENT RADIATION
GAMMA RADIATION
LASER RADIATION
ULTRAVIOLET RADIATION
X RADIATION
Atoms as many-body systems, 20:8951 (R;US)

ELECTROMAGNETIC TRANSITIONS
See ENERGY-LEVEL TRANSITIONS

ELECTROMAGNETIC WAVES
See ELECTROMAGNETIC RADIATION

ELECTROMAGNETS
See also BEAM BENDING MAGNETS
BEAM FOCUSING MAGNETS
SUPERCONDUCTING MAGNETS
WIGGLER MAGNETS
Parallel computation of automatic differentiation applied to magnetic field calculations, 20:8302 (R;US)

ELECTRON ACCEPTOR
See ELECTRONS

ELECTRON BEAM ION SOURCES
Cross-over electron beam ion sources, 20:8316 (IA;IR;In English, Persian)

ELECTRON BEAMS
100 MeV laser accelerator demonstration and 1 GeV baseline design development. 1992 Annual report, 20:8287 (R;US)
A review of electron scattering at intermediate energies, 20:8913 (IA;IR;In English, Persian)
Depolarization in the SLC Collider Arcs, 20:8306 (R;US)
Design study of beam dynamics issues for 1 TeV next linear collider based upon the relativistic-klystron two-beam accelerator, 20:8304 (R;US)
Design study of longitudinal dynamics of the drive beam in 1 TeV relativistic klystron two-beam accelerator, 20:8303 (R;US)
Over-compression, a method to shape the longitudinal bunch distribution for a reduced energy spread, 20:8307 (R;US)
Polarization at SLAC, 20:8329 (R;US)
Proposal for using optical transition radiation for electron beam alignment and emittance measurement for the free emittance measurement for the free electron laser experiments at ATF, 20:8299 (R;US)
Tutorial on beam-based feedback systems for linacs, 20:8308 (R;US)

ELECTRON DIFFRACTION
The effect of a non-hermitian crystal potential on the scattering matrix in reflection electron diffraction, 20:9017 (R;AU)
Zone axis backscattered electron contrast for fast electrons, 20:9013 (R;AU)

ELECTRON DONOR
See ELECTRONS

ELECTRON GAS
Relativistic non-interacting electron gas in a magnetic field, 20:9025 (R;AU)

ELECTRON GUNS
Lasers for RF guns: Proceedings, 20:8310 (R;US)

ELECTRON PARAMAGNETIC RESONANCE
See ELECTRON SPIN RESONANCE

ELECTRON REACTIONS
Electron-atom collision studies using optically state selected beams. Progress report, May 15, 1988–May 14, 1991, 20:8960 (R;US)

ELECTRON SOURCES
Review of the SLAC and Les Houches workshops, 20:8330 (R;US)

ELECTRON SPIN RESONANCE
Approximated expression for the dispersion EPR profile., 20:8984 (IA;MX)
Identification of irradiated mangoes by the electron spin resonance technique., 20:8204 (IA;MX)

ELECTRON-ATOM COLLISIONS
Electron-atom collision studies using optically state selected beams. Progress report, May 15, 1987–May 14, 1988, 20:8959 (R;US)
Inversion of the total cross sections for electron-molecule and electron-atom scattering, 20:8964 (R;AU)

ELECTRON-MOLECULE COLLISIONS
Inversion of the total cross sections for electron-molecule and electron-atom scattering, 20:8964 (R;AU)

ELECTRON-POSITRON COLLISIONS
Spin Momentum Correlation (Handedness) in the Process of Four Pion Production in the Electron-Positron Collisions, 20:8801 (R;XJ)

ELECTRON-POSITRON INTERACTIONS
CP violating effects in $e^+ e^- \rightarrow ZH$ and their optimization, 20:8747 (R;AU)
Search for new physics indirect effects in $e^+e^- \rightarrow W^+W^-$ at linear colliders with polarized beams, 20:8791 (R;XA)
Study of $b\bar{b}$ production in e^+e^- annihilation at $\sqrt{s} = 29$ GeV with the aid of neural networks, 20:8803 (R;US)
Testing supersymmetry at the next linear collider, 20:8736 (R;US)

ELECTRONIC CIRCUITS
See also GATING CIRCUITS
MICROELECTRONIC CIRCUITS
Linear optocoupler, 20:8274 (PA;US)
Silicon heat pipes for cooling electronics, 20:8257 (R;US)
User's guide and physics manual for the SCATPlus circuit code, 20:9176 (R;US)

ELECTRONIC EQUIPMENT
See also PULSE INTEGRATORS
A portable planar ^{90}Sr irradiation setup for total dose testing of electronic devices, 20:8407 (RA;IL)
Study of a single-event-upset in PAL16R8, 20:8406 (RA;IL)

ELECTRONS
Fast successive charge captures in the positron spur by halogenated compounds in methanol., 20:8967 (IA;MX)

ELECTROSTATIC ANALYZERS
Calibration of multichannel analyzer of charge-exchange atoms, 20:9060 (R;RU;In Russian)

ELECTROSTATIC PRECIPITATORS
Fundamental mechanisms in flue gas conditioning. Quarterly report, July 1994–September 1994, 20:7156 (R;US)

ELECTROSTATIC WAVES
See PLASMA WAVES

ELECTROWEAK MODEL
See WEINBERG-SALAM GAUGE MODEL

ELEMENTARY PARTICLES
See also CHARM PARTICLES
LEPTONS
Introduction to the theory of Goyaks. Operator manifold approach to geometry and particle physics, 20:8720 (R;XA)
The Foldy-Wouthuysen transformation, 20:8751 (R;AU)

EMBANKMENTS
Seismic analysis of the Par Pond Dam: Study of slope failure and liquefaction. Technical evaluation report, 20:8646 (R;US)

EMBRYOS
Surface contraction and expansion waves correlated with differentiation in axolotl embryos. III. The shape of the fate map, 20:8571 (RA;US)

EMERGENCIES
See ACCIDENTS

EMERGENCY ENERGY CONSERVATION ACT
See EMERGENCY PLANS
ENERGY CONSERVATION

EMERGENCY PLANS
Modeling and assessment of accident consequences; development of RODOS, a real-time on-line decision support system for nuclear emergencies in Europe, 20:7816 (RA;DE;In German)
Sector emergency procedures for Pakistan Research Reactor-1 (PARR-1) PINSTECH, 20:7778 (R;PK)
The challenge of emergency response dispersion models on the meso-gamma urban scale: A case study of the July 26, 1993 Oleum tank car spill in Richmond, California, 20:8645 (R;US)

EMERGENCY PROVISIONS
See EMERGENCY PLANS

EMERY OPERATION
See NUCLEAR EXPLOSIONS
UNDERGROUND EXPLOSIONS

EMISSION SPECTRA
Emission Moessbauer spectroscopic studies on mixed valence states of Fe-57 atoms produced in Co-57 labelled trinuclear cobalt-iron carboxylates., 20:8157 (IA;MX)
The Inclusive Energy Spectra of Light Charged Particles (p, d, t, ^{4}He) from Spontaneous Fission of ^{248}Cm, 20:8915 (RA;XJ;In Russian)

EMPLOYEES
See PERSONNEL

EMULSIFICATION
Study of new technology of W/O emulsion for compression ignition diesel engine, 20:7572 (R;KR;In Korean)

ENDF
See NUCLEAR DATA COLLECTIONS

ENERGY
See also GEOTHERMAL ENERGY
SOLAR ENERGY
A study on the energy database establishment, 20:7976 (R;KR;In Korean)

ENERGY CONSERVATION
Development of the software for energy savings in chemical processes(I), 20:8026 (R;KR;In Korean)

ENERGY CONSUMPTION
See also FUEL CONSUMPTION
Documentation of the petroleum market model (PMM). Appendix: Model developer's report, 20:7236 (R;US)
Energy use and domestic hot water consumption - Phase 1. Final report, 20:7986 (R;US)
Model documentation natural gas transmission and distribution model (NGTDM) of the national energy modeling system. Volume II: Model developer's report, 20:7249 (R;US)

ENERGY CONVERSION
Energy conversion research at the PSI: combustion, fuels from biomass, solar energy, 20:7914 (IA;CH)

ENERGY DEMAND
Petroleum marketing annual 1993, 20:7233 (R;US)
Winter fuels report, 20:7235 (R;US)

ENERGY EFFICIENCY
Development of an energy efficient industrial gas combustion system, 20:7258 (R;KR;In Korean)
Differences between the 1992 and 1993 CABO Model Energy Codes, 20:8008 (R;US)
Turning research into results, final report, 20:7961 (R;US)

ENERGY OPERATORS
See HAMILTONIANS

ENERGY POLICY
Energy and sustainability: a global view, 20:7835 (IA;CH)
Energy research in the European Union, 20:7840 (IA;CH)
Politics and public policy: critical factors for sustainability in the energy sector, 20:7836 (IA;CH)
Sustainability as seen by the entrepreneur, 20:7837 (IA;CH)
US–Japan energy policy consultations, 20:7888 (R;US)

ENERGY RESEARCH ADVISORY BOARD
See RESEARCH PROGRAMS

ENERGY SOURCE DEVELOPMENT
Summaries of FY 1994 geosciences research, 20:8648 (R;US)

ENERGY SOURCES
See also FOSSIL FUELS
NUCLEAR FUELS
RENEWABLE ENERGY SOURCES
WOOD FUELS
Summaries of FY 1994 geosciences research, 20:8648 (R;US)

ENERGY STORAGE
See also COLD STORAGE
OFF-PEAK ENERGY STORAGE
The energy storage program of PSI, 20:7825 (IA;CH)

ENERGY STORAGE SYSTEMS
See also MAGNETIC ENERGY STORAGE EQUIPMENT
THERMAL ENERGY STORAGE EQUIPMENT
Simulation of diurnal thermal energy storage systems: Preliminary results, 20:7600 (R;US)

ENERGY SUPPLIES
See also FUEL SUPPLIES

JINR rapid communications. Collection 5, 20:7685 (R;XJ;In English, Russian)

ENERGY SYSTEMS
See also COOLING SYSTEMS
ENERGY STORAGE SYSTEMS
HEAT DISTRIBUTION SYSTEMS
HEATING SYSTEMS
HYDROTHERMAL SYSTEMS
LIGHTING SYSTEMS
NATURAL GAS DISTRIBUTION SYSTEMS
Methods for the integral assessment of energy-related problems, 20:7844 (IA;CH)

ENERGY-LEVEL TRANSITIONS
See also MULTIPOLE TRANSITIONS
Nature of Negative Parity of Collective Modes, 20:8864 (R;XJ;In Russian)

ENGINEERING
See also NUCLEAR ENGINEERING
Report to the Department of Energy on the DOE/EPSCoR planning activities for the state of South Dakota, 20:8221 (R;US)
Summaries of FY 1994 engineering research, 20:7871 (R;US)

ENGINEERING DRAWINGS
Light Duty Utility Arm interface control document plan, 20:7380 (R;US)

ENGLAND
See UNITED KINGDOM

ENHANCED RECOVERY
See also MICROBIAL EOR
A model technology transfer program for independent operators: Kansas Technology Transfer Model (KTTM), 20:7202 (R;US)
Enhanced oil recovery. Progress review, October–December 1993, 20:7195 (R;US)
Surfactant development for enhanced oil recovery. Fourth quarterly report, July 1, 1994–September 30, 1994, 20:7226 (R;US)
Surfactant-enhanced alkaline flooding for light oil recovery. Quarterly report, April 1–June 30, 1994, 20:7208 (R;US)
Surfactant-enhanced alkaline flooding for light oil recovery. Quarterly report, July 1–September 30, 1994, 20:7209 (R;US)
Surfactant-enhanced alkaline flooding for light oil recovery. Quarterly report, April 1–June 30, 1994, 20:7208 (R;US)
Surfactant-enhanced alkaline flooding for light oil recovery. Quarterly report, July 1–September 30, 1994, 20:7209 (R;US)

ENRICHMENT (ISOTOPIC)
See ISOTOPE SEPARATION

ENTRAINMENT SEPARATORS
See MIST EXTRACTORS

ENVIRONMENT
Integration of heterogeneous data bases for development of a large-scale environmental data atlas for multi-platform PC and workstation users, 20:7503 (R;US)

ENVIRONMENTAL EXPOSURE PATHWAY
Estimating exposure of terrestrial wildlife to contaminants, 20:8641 (R;US)

ENVIRONMENTAL IMPACTS
High resolution seismic imaging of Rainier Mesa using surface reflection and surface to tunnel tomography, 20:8428 (R;US)

ENVIRONMENTAL MATERIALS
Road Transportable Analytical Laboratory (RTAL) system. Quarterly progress report, August 1994–October 1994, 20:8154 (R;US)

ENVIRONMENTAL POLICY
Analysis of the international environment for the national nuclear technology development in the post-coldwar era, 20:9140 (R;KR;In Korean)
Theory and practice of internalisation of external costs, 20:7842 (IA;CH;In German)

ENVIRONMENTAL PROTECTION AGENCY
See US EPA

ENVIRONMENTAL QUALITY
See also WATER QUALITY
Ecological risk assessment benefits environmental management, 20:7866 (R;US)

ENVIRONMENTAL TRANSPORT
See also RADIONUCLIDE MIGRATION
Development of a three-dimensional groundwater flow model for Western Melton Valley: Application of P-FEM on a DOE waste site, 20:7451 (R;US)
Radiation exposure due to gamma-ray submersion, 20:7753 (R;DE;In German)
Toward resolving model-measurement discrepancies of radon entry into houses, 20:8460 (R;US)

EPA
See US EPA

EPR
See ELECTRON SPIN RESONANCE

EPSILON RESONANCES
See MESONS

EQUIPMENT
See also APPLIANCES
CONTROL EQUIPMENT
ELECTRICAL EQUIPMENT
ELECTRONIC EQUIPMENT
MAGNETIC ENERGY STORAGE EQUIPMENT
MATERIALS HANDLING EQUIPMENT
MINING EQUIPMENT
POLLUTION CONTROL EQUIPMENT
PORTABLE EQUIPMENT
REMOTE VIEWING EQUIPMENT
SAMPLERS
SOLAR EQUIPMENT
THERMAL ENERGY STORAGE EQUIPMENT
Apparatus for unloading pressurized fluid, 20:7822 (PA;US)
Commercial equipment cost database, 20:8037 (R;US)
Report of clean out and flushing of UO_3 Plant processing equipment: Revision 1, 20:7492 (R;US)

EQUIPMENT INTERFACES
Light Duty Utility Arm interface control document plan, 20:7380 (R;US)
Operability test procedure for the 340-NT-EX stack upgrades – Project W337, 20:7458 (R;US)

ERBIUM 151
Particle-phonon excitations in valence-neutron and valence-proton nuclei around ^{146}Gd, 20:8866 (R;DE;In German)

ERYTHROCYTES
Contribution of ankyrin-band 3 complexes to the organization and mechanical properties of the membrane skeleton of human erythrocyte, 20:8552 (R;US)

ESCHERICHIA COLI
Influence of recD1013 and recJ284 mutations of Escherichia coli on indirect recombinogenesis of lambda phage., 20:8614 (I;MX;In Spanish)

ESR
See ELECTRON SPIN RESONANCE

ESTUARINE ECOSYSTEMS
See AQUATIC ECOSYSTEMS

ETA-700 RESONANCES
See MESONS

ETHANE
Novel process for depolymerization of coal to C_2-C_4 hydrocarbons. Final report, 1 September 1989–31 August 1993, 20:7111 (R;US)

ETHANOL
Development of a catalyst for conversion of syngas-derived materials to isobutylene. Quarterly report number 11, October 1–December 31, 1993, 20:7563 (R;US)
Development of a dedicated ethanol ultra-low emission vehicle (ULEV) system design, 20:8064 (R;US)

ETHERS
High octane ethers from synthesis gas-derived alcohols. Quarterly technical progress report, January–March, 1993, 20:7564 (R;US)
The Energy Information Administration's assessment of reformulated gasoline: An update, 20:7238 (R;US)

ETHINE
See ACETYLENE

ETHNIC GROUPS
See MINORITY GROUPS

ETHOCEL
See ETHERS
ETHYL ALCOHOL
See ETHANOL
ETHYLENE
A simulated countercurrent moving-bed chromatographic reactor for the oxidative coupling of methane: Experimental results, 20:7571 (R;US)
Novel process for depolymerization of coal to C_2-C_4 hydrocarbons. Final report, 1 September 1989–31 August 1993, 20:7111 (R;US)
ETHYLENE POLYMERS
See POLYETHYLENES
ETHYLENECARBOXYLIC ACID
See ACRYLIC ACID
ETHYNE
See ACETYLENE
ETHYRONE
See ORGANIC SULFUR COMPOUNDS
ETHYRONEETHYL PHOSPHINATE
See ORGANIC SULFUR COMPOUNDS
EUROPE
See also USSR
Internalisation of external costs in Switzerland and Europe, 20:7843 (IA;CH)
Transportation technology transitions and macroeconomic growth – Contemporary evidence, 20:8010 (R;US)
EUROPEAN COMMUNITIES
See EUROPEAN UNION
EUROPEAN UNION
Energy research in the European Union, 20:7840 (IA;CH)
EVALUATED NUCLEAR DATA FILE
See NUCLEAR DATA COLLECTIONS
EVEN-EVEN NUCLEI
See also BARIUM 126
BARIUM 128
BARIUM 130
BERYLLIUM 10
BERYLLIUM 8
CADMIUM 104
CALIFORNIUM 238
CURIUM 248
HAFNIUM 180
LEAD 204
LEAD 208
MAGNESIUM 24
MOLYBDENUM 100
OSMIUM 190
PLUTONIUM 240
RADON 222
STRONTIUM 90
THORIUM 232
TIN 100
URANIUM 238
Evidence foe phase transitional behavior of even-even nuclei from differential observables, 20:8855 (RA;IL)
EXCHANGE (HEAT)
See HEAT TRANSFER
EXCRETION ANALYSIS
See PERSONNEL MONITORING
EXHAUST SYSTEMS
Purex canyon exhaust fan bearing temperature monitoring system doric 245 datalogger programming, 20:7408 (R;US)
EXOTIC RESONANCES
Search for exotic baryons with the SPHINX facility, 20:8832 (R;RU)
EXPERIMENT PLANNING
Science is in the eye of the beholder, 20:8551 (RA;US)
EXPERIMENTAL FACILITIES (ACCELERATOR)
See ACCELERATOR FACILITIES
EXPERT SYSTEMS
Current practices and future trends in expert system developments for use in the nuclear industry. Report of a specialists meeting held in Tel Aviv, Israel, 11-15 October 1993, 20:7739 (R;XA)
EXPOSURE (RADIATION DOSES)
See RADIATION DOSES
EXTRACTION (BEAM)
See BEAM EXTRACTION
EXTRACTION COLUMNS
242-A Evaporator ion exchange column (IX-D-1) tie down evaluation, 20:7391 (R;US)

F

F-1540 RESONANCES
See MESONS
FABRIC FILTERS
Fundamental mechanisms in flue gas conditioning. Quarterly report, July 1994–September 1994, 20:7156 (R;US)
FACE CENTERED CUBIC
See FCC LATTICES
FACILITIES (ACCELERATOR)
See ACCELERATOR FACILITIES
FACILITIES (EDUCATIONAL)
See EDUCATIONAL FACILITIES
FACILITIES (NUCLEAR)
See NUCLEAR FACILITIES
FACILITIES (STORAGE)
See STORAGE FACILITIES
FACILITIES (TEST)
See TEST FACILITIES
FALLOUT DEPOSITS
Uncertainty and sensitivity analysis of food pathway results with the MACCS Reactor Accident Consequence Model, 20:8509 (R;US)
FALLOUT PARTICULATES
See PARTICLES
FANS
See BLOWERS
FARADAY GENERATORS
See MHD GENERATORS
FAST BREEDER TYPE REACTORS
See FBR TYPE REACTORS
FAST FLUX TEST FACILITY REACTOR
See FFTF REACTOR
FAST REACTORS
See also ACTINIDE BURNER REACTORS
FBR TYPE REACTORS
FFTF REACTOR
IFR REACTOR
Civil plutonium handling experience in the production of fuel, fuel elements and assemblies for fast reactors, 20:7676 (RA;XA)
FAST-MIXED SPECTRUM REACTOR
See FBR TYPE REACTORS
FASTENERS
242-A Evaporator ion exchange column (IX-D-1) tie down evaluation, 20:7391 (R;US)
FATIGUE
Development of fatigue monitoring system in nuclear power plants, 20:7696 (R;KR;In Korean)
FAULTLESS EVENT
See NUCLEAR EXPLOSIONS
UNDERGROUND EXPLOSIONS
FBR TYPE REACTORS
Actinide burning in fast reactors. KfK contributions to the CAPRA code, 20:7321 (RA;DE;In German)
Analysis of core disruptive accidents in fast reactors, 20:7792 (RA;DE;In German)
Studies of passive after-heat removal for fast reactors, 20:7791 (RA;DE;In German)
FCC LATTICES
Study of point defects and matter transport in cubic face centered concentrated alloys, 20:8073 (R;FR;In French)
FEDERAL REGION I
See USA

FEDERAL REGION II
See USA
FEDERAL REGION III
See USA
FEDERAL REGION IV
See USA
FEDERAL REGION IX
See USA
FEDERAL REGION V
See USA
FEDERAL REGION VI
See USA
FEDERAL REGION VII
See USA
FEDERAL REGION VIII
See USA
FEDERAL REGION X
See USA
FEDERAL REPUBLIC OF GERMANY
Problems concerning the accumulation of isolated plutonium - Situation in Germany, 20:7268 (RA;XA)
The outlook for natural gas in Germany, 20:7250 (R;NO)
FEED MATERIALS PLANTS
See also FEED MATERIALS PRODUCTION CENTER
International comparison of environmental protection provisions in remedial actions on uranium mine and mill tailings, 20:8492 (IA;CZ;In German)
The Institute's view of the use of wastes for environmental remedial actions and land reclamation, 20:8493 (IA;CZ;In Czech)
FEED MATERIALS PRODUCTION CENTER
Draft final feasibility study report and proposed plan for Operable Unit 4, response to comments: Fernald Environmental Management Project, Fernald, Ohio, 20:7476 (R;US)
Integrated planning: A baseline development perspective, 20:7475 (R;US)
Uranium-contaminated soils: Ultramicrotomy and electron beam analysis, 20:7441 (R;US)
FERMENTATION ALCOHOL
See ETHANOL
FERMIONS
See also LEPTONS
QUARKS
Effective Lagrangian approach to the fermion mass problem, 20:8772 (R;AU)
Electronic structure and pairing of strongly correlated fermions: Fermi liquid versus spin liquid, 20:9029 (R;US)
Renormalization group analyses of particle masses in full four-generation fermion condensate scheme, 20:8756 (R;XA)
FERNALD PRODUCTION PLANT
See FEED MATERIALS PRODUCTION CENTER
FERRIC COMPOUNDS
See IRON COMPOUNDS
FERROMAGNETISM
Ferromagnetic Potts model in a magnetic field: Finite lattice extrapolation of the (1+1)-dimensional Hamiltonian, 20:9022 (R;XA)
FERROUS COMPOUNDS
See IRON COMPOUNDS
FESHBACH-PORTER-WEISSKOPF MODEL
See OPTICAL MODELS
FFTF REACTOR
Calculation of transmutation in copper and comparison with measured electrical properties, 20:8105 (R;US)
Design review report FFTF interim storage cask, 20:7283 (R;US)
FIBER OPTICS
Reduction in fiber damage thresholds due to static fatigue, 20:8131 (R;US)
FIBERGLASS
AURA™: A fiberglass based vacuum insulation panel technology, 20:7993 (RA;US)
FIELDS (ELECTROMAGNETIC)
See ELECTROMAGNETIC FIELDS
FIELDS (MAGNETIC)
See MAGNETIC FIELDS
FILAMENT (PLASMA)
See PLASMA FILAMENT
FILLERS
Tetraethyl orthosilicate-based glass composition and method, 20:8172 (PA;US)
FILM FLOW
Heat transfer and hydrodynamics of falling liquid films, 20:8260 (R;FI)
FILMS
See also THIN FILMS
X-ray and neutron scattering from amorphous diamondlike carbon and hydrocarbon films, 20:8989 (R;DK)
FINGERPRINTING (OIL SPILLS)
See OIL SPILLS
FINISHED OILS
See PETROLEUM PRODUCTS
FINLAND
Contribution of organic acids to the acidity of Finnish lakes, 20:8549 (R;FI)
The demand for electricity is growing but what about the production?, 20:7911 (R;FI;In Finnish)
FIRE FLOODING
See IN-SITU COMBUSTION
FIRE STATIONS
See PUBLIC BUILDINGS
FIREDAMP
See METHANE
FIREWOOD
See WOOD FUELS
FIRST WALL
A three-bar model for ratcheting of fusion reactor first wall, 20:9094 (R;US)
Changes in surface topography of Fcc metals due to helium bombardment, 20:9098 (RA;IL)
Shakedown analysis of fusion reactor first wall, 20:9096 (R;US)
Surface behavior of first-wall due to the synergistic effect of helium and hydrogen isotopes, 20:9100 (RA;IL)
FISCHER-TROPSCH SYNTHESIS
Fischer Tropsch synthesis in supercritical fluids. Quarterly technical progress report, July 1, 1994–September 30, 1994, 20:8182 (R;US)
Fischer-Tropsch synthesis in supercritical reaction media. Quarterly progress report, July 1–September 31, 1994, 20:7567 (R;US)
FISH CULTURE
See FISHERIES
FISH HATCHERIES
See FISHERIES
FISH LADDERS
See FISH PASSAGE FACILITIES
FISH LIFTS
See FISH PASSAGE FACILITIES
FISH LOCKS
See FISH PASSAGE FACILITIES
FISH PASSAGE FACILITIES
Evaluation of juvenile fish bypass and adult fish passage facilities at water diversions in the Umatilla River. Annual and interim progress report, October 1990–September 1991, 20:7573 (R;US)
FISHERIES
Umatilla hatchery monitoring and evaluation. Annual report 1993, September 1, 1992–October 30, 1993, 20:7576 (R;US)
FISHES
Ecosystem diagnosis and treatment planning model as applied to supplementation. Model description, user guide, and theoretical documentation for the model introduce in the summary report series on supplementation in the Columbia basin, 20:8523 (R;US)
Movements of white sturgeon in Lake Roosevelt. Final report, 1988–1991, 20:7578 (R;US)
FISHWAYS
See FISH PASSAGE FACILITIES
FISSILE MATERIALS
Equivalence relations for the 9972-9975 SARP, 20:7285 (R;US)

FISSION
See also PHOTOFISSION
Diffusion process of nuclear fission, 20:8900 (RA;CN)
FISSION BARRIER
Review and evaluation of fission barrier properties research, 20:8901 (RA;CN)
FISSION FRAGMENTS
Study on space-time evolution of plasma of heavy charged particle track in noble gases, 20:8961 (R;RU;In Russian)
FISSION PRODUCT RELEASE
Development of computing code system for level 3 PSA -A study for nuclear safety improvement-, 20:7756 (R;KR;In Korean)
Uncertainty and sensitivity analysis of chronic exposure results with the MACCS reactor accident consequence model, 20:7820 (R;US)
Uncertainty and sensitivity analysis of early exposure results with the MACCS Reactor Accident Consequence Model, 20:7821 (R;US)
FISSION PRODUCTS
Development of debris resistant bottom end piece, 20:7659 (R;KR;In Korean)
Process to remove rare earth from IFR electrolyte, 20:7278 (PA;US)
FISSIONABLE MATERIALS MANAGEMENT
See NUCLEAR MATERIALS MANAGEMENT
FISSURED FORMATIONS
See FRACTURED RESERVOIRS
FIXED-PRICE CONTRACTS
See CONTRACTS
FLAME CHAMBER PROCESS
See WASTE PROCESSING
FLAMES
Design study for advanced flame quality indicator, 20:7956 (RA;US)
FLASKS
See CASKS
FLINTLOCK OPERATION
See NUCLEAR EXPLOSIONS
UNDERGROUND EXPLOSIONS
FLOODING FLUIDS
See DISPLACEMENT FLUIDS
FLOORS
A study on the performance evaluation technique of prefabricated Ondol(II), 20:7964 (R;KR;In Korean)
FLORIDA
Tampa Electric Company Polk Power Station Unit Number 1. Annual report, January–December, 1993, 20:7629 (R;US)
FLOTATION
Removal of pyrite and trace elements from waste coal by dissolved-CO_2 flotation and chelating agents. Final technical report, September 1, 1993–August 31, 1994, 20:7098 (R;US)
FLOW (BLOOD)
See BLOOD FLOW
FLOW (FLUID)
See FLUID FLOW
FLUE GAS
Advanced separation technology for flue gas cleanup. Quarterly technical report No. 10, 20:7635 (R;US)
Aerosols in black liquor combustion, 20:7559 (RA;FI)
Direct catalytic decomposition of nitric oxide. Quarterly technical progress report number 12, July–September, 1994, 20:8436 (R;US)
Electric Power Research Institute: Environmental Control Technology Center report to the Steering Committee, August 1994. [Monthly report], 20:7160 (R;US)
Electric Power Research Institute: Environmental Control Technology report to the Steering Committee, July 1994. [Monthly report], 20:7159 (R;US)
Fundamental mechanisms in flue gas conditioning. Quarterly report, July 1994–September 1994, 20:7156 (R;US)
High SO_2 removal efficiency testing. Quarterly status report, April–June, 1994, 20:7634 (R;US)
Hot coal gas desulfurization with manganese-based sorbents, 20:7105 (R;US)
Investigation of combined SO_2/NO_x removal by Ceria sorbents. Quarterly technical progress report, July 1994–September 1994, 20:7154 (R;US)
LIFAC Sorbent Injection Desulfurization Demonstration Project. Quarterly Report No. 16, July-September 1994, 20:7158 (R;US)
LIFAC Sorbent Injection Desulfurization Demonstration Project. Quarterly report No. 15, April–June 1994, 20:7157 (R;US)
Membrane contactors to replace conventional scrubbers, 20:7638 (R;DK)
Microbial reduction of SO_2 and NO_x as a means of by-product recovery/disposal from regenerable processes for the desulfurization of flue gas. Technical progress report, September 11, 1992–December 11, 1992, 20:7155 (R;US)
Optimized construction and use of flue-gas heat exchangers in the large natural gas fueled boilers, 20:7639 (R;DK;In Danish)
FLUID FLOW
See also COMPRESSIBLE FLOW
FILM FLOW
GAS FLOW
HYPERSONIC FLOW
TURBULENT FLOW
Three-dimensional conceptual model for the Hanford Site unconfined aquifer system: FY 1994 status report, 20:8512 (R;US)
FLUID INJECTION
See also WATERFLOODING
Improving reservoir conformance using gelled polymer systems. Quarterly progress report, July 1–September 30, 1994, 20:7207 (R;US)
Responsive copolymers for enhanced petroleum recovery. Quarterly technical progress report, June 23–September 21, 1994, 20:8180 (R;US)
FLUID MECHANICS
See also HYDRODYNAMICS
Linear non-modal phenomena in numerical analysis and applied mathematics. First annual performance report, February 15, 1994–November 15, 1994, 20:9162 (R;US)
FLUIDIZATION
Fundamental Fluidization Research Project. Environmental Assessment, 20:7167 (R;US)
FLUIDIZED BED
See FLUIDIZED BEDS
FLUIDIZED BEDS
Aerosol particle characteristics from pressurised fluidised bed coal gasification, 20:7140 (RA;FI)
Fundamental Fluidization Research Project. Environmental Assessment, 20:7167 (R;US)
FLUIDIZED-BED COMBUSTION
Real scale studies on alkali metal transformations in atmospheric CFBC of coal, 20:7181 (RA;FI)
FLUIDIZED-BED COMBUSTORS
Combustion experiments of fuel gases in atmospheric fluidized bed combustor test rig, 20:7186 (R;FI)
FLUORESCENCE SPECTROSCOPY
Analysis of Pre colombian Mexican golden pieces by X-ray fluorescence spectrometry., 20:8161 (IA;MX)
FLUORIMETRY
See FLUORESCENCE SPECTROSCOPY
FLUORS
See PHOSPHORS
FLUX CONSERVING TOKAMAKS
See TOKAMAK DEVICES
FLY ASH
A coal-fired combustion system for industrial process heating applications. Quarterly technical progress report, April 1994–June 1994, 20:7172 (R;US)
Development of CCS application technology in industries (II), 20:7188 (R;KR;In Korean)
Field studies on ash transformation during pulverized coal combustion of bituminous coal, 20:7182 (RA;FI)
Fundamental mechanisms in flue gas conditioning. Quarterly report, July 1994–September 1994, 20:7156 (R;US)

FOILS
PIXE analysis setup using a proton in air beam facility at the ININ., 20:8156 (IA;MX)
FOOD
See also MEAT
MILK
Measuring program of the Federal Republic of Germany. Results of environmental measurement in Russia, Byelorussia and Ukraine in the time from May 17 to September 2, 1993, and from October 8 to November 1, 1993, 20:8496 (R;DE;In German)
FOOD CHAINS
Environmental monitoring plan, July 1–December 31, 1994, 20:7855 (R;US)
Environmental monitoring report, May 10, 1993–June 1, 1994, 20:7854 (R;US)
Uncertainty and sensitivity analysis of food pathway results with the MACCS Reactor Accident Consequence Model, 20:8509 (R;US)
FOOD IRRADIATION
See FOOD PROCESSING
FOOD PROCESSING
Gas chromatographic analysis of volatile hydrocarbons to detect irradiated chicken, pork and beef - an intercomparison study. A report in English and German, 20:8600 (R;DE;In English, German)
Thermoluminescence analysis to detect irradiated spices, herbs and spice-and-herb mixtures - an intercomparison study. A report in English and German, 20:8601 (R;DE;In English, German)
FOODSTUFFS
See FOOD
FORESTS
Modelling the impacts of sulphur and nitrogen deposition on forests, 20:8515 (R;SE)
FORSCHUNGSREAKTOR BERLIN-2
See BER-2 REACTOR
FOSSIL FUEL RESERVES
See FOSSIL FUELS
FOSSIL FUELS
See also COAL
NATURAL GAS
PEAT
PETROLEUM
Bioprocessing in nonaqueous media - critical needs and opportunities, 20:7570 (R;US)
FOSSIL-FUEL POWER PLANTS
Continuous method for coal fired power plant particle emission mass monitoring, 20:7637 (RA;FI)
Hourly simulations of hybrid renewable energy systems for San Cristobal/Santa Barbara, Guatemala, 20:8049 (R;US)
FOURIER TRANSFORM SPECTROMETERS
FT-IR microscopical analysis with synchrotron radiation: The microscope optics and system performance, 20:8981 (R;US)
FOURIER TRANSFORMATION
Development of PC-based FFT system for reactor dynamic analysis, 20:7644 (R;PK)
FRACTURED FORMATIONS
See FRACTURED RESERVOIRS
FRACTURED RESERVOIRS
Models of natural fracture connectivity – Implications for reservoir permeability. Final report, 20:8649 (R;US)
Simulation studies to evaluate the effect of fracture closure in the performance of naturally fractured reservoirs. Third quarterly progress report, 20:7196 (R;US)
Simulation studies to evaluate the effect of fracture closure on the performance of naturally fractured reservoirs. Annual report, 20:7198 (R;US)
Simulation studies to evaluate the effect of fracture closure on the performance of naturally fractured reservoirs. Annual report, 20:7197 (R;US)
FRAGMENTS (FISSION)
See FISSION FRAGMENTS
FRAGMENTS (PARTICLES)
See PARTICLES
FRANCE
Industrial reprocessing and recycling in France: An effective plutonium management method, 20:7267 (RA;XA)
Monthly results of measurements; Jun 1994, 20:8510 (R;FR;In French)
Safety of plutonium shipments in and from France, 20:7280 (RA;XA)
FREE ELECTRON LASERS
An FEL design code running on Mathcad™, 20:8294 (R;US)
Development of high power free-electron lasers, 20:8293 (R;KR;In Korean)
Development of high power free-electron lasers, 20:8232 (R;KR;In Korean)
Free Electron Laser as Energy Driver for Inertial Confinement Fusion, 20:9105 (R;XJ)
On a Possibility to Construct High-Intensity Monochromatic Gamma-Source at HERA and LEP, 20:8322 (R;XJ)
Undulators for short wavelength FEL amplifiers, 20:8270 (R;US)
FREEZERS
Aerogels - a foam alternative, 20:7991 (RA;US)
Cooling and air conditioning with water/zeolite, 20:7996 (RA;US)
Cyclopentane as blowing agent for rigid polyurethane foam in refrigerator insulation, 20:8035 (RA;US)
Development of evacuated panel thermal insulations, 20:7990 (RA;US)
The conversion of German household-appliance refrigeration industry from CFC's to hydrocarbons and fluorocarbons in 1993, 20:8003 (RA;US)
Vacuum Insulation Panels (VIPs), 20:7992 (RA;US)
FREQUENCY CONVERTERS
Temperature-insensitive phase-matched optical harmonic conversion crystal, 20:8273 (PA;US)
FRESH WATER
Eutrophication of soil, fresh water and the sea, 20:8516 (R;SE)
FRESH WATER ECOSYSTEMS
See AQUATIC ECOSYSTEMS
FRIAMBIENT PROCESS
See COAL LIQUEFACTION
FTR REACTOR (RICHLAND)
See FFTF REACTOR
FUEL ADDITIVES
High octane ethers from synthesis gas-derived alcohols. Quarterly technical progress report, January–March, 1993, 20:7564 (R;US)
FUEL ASSEMBLIES
Constant system for by-channel thermal-hydraulic calculation of fuel assembly operational conditions in reactors with natural and mixed convection, 20:7700 (R;RU;In Russian)
Numerical analysis of nonstationary temperature fields in central zones of nuclear reactor fuel assemblies, 20:7701 (R;RU;In Russian)
FUEL CELL POWER PLANTS
MCFC development for logistic fuel applications, 20:7936 (RA;US)
Status of 250 kW product development test at San Diego Gas & Electric, 20:7942 (RA;US)
Status of Santa Clara MCFC product development test, 20:7941 (RA;US)
Status of Unocal product development testing, 20:7944 (RA;US)
Update: Commercialization of the direct fuel cell, 20:7938 (RA;US)
FUEL CELLS
See also ACID ELECTROLYTE FUEL CELLS
HYDROGEN FUEL CELLS
NATURAL GAS FUEL CELLS
SOLID ELECTROLYTE FUEL CELLS
Proton exchange membrane fuel cell for transportation, 20:8060 (RA;US)
Trace species removal for fuel cell application, 20:7931 (RA;US)
FUEL CONSUMPTION
Study on classification of fuel consumption for waggon and jeep and comparison of CVS-75 mode and on-road fuel economy, 20:8013 (R;KR;In Korean)

FUEL COOLING INSTALLATIONS
See SPENT FUEL STORAGE

FUEL ECONOMY
See FUEL CONSUMPTION

FUEL ELEMENTS
See also FUEL PLATES
FUEL RODS
SPENT FUEL ELEMENTS
Civil plutonium handling experience in the production of fuel, fuel elements and assemblies for fast reactors, 20:7676 (RA;XA)
Comparison of irradiation behavior of different uranium silicide dispersion fuel element designs, 20:7698 (R;US)
Technique for calculating temperature conditions for fuel elements with bilateral heat removal taking into account axial heat fluxes, 20:7699 (R;RU;In Russian)

FUEL FABRICATION PLANTS
Estimation and characterization of decontamination and decommissioning solid waste expected from the Plutonium Finishing Plant, 20:7368 (R;US)
Some safety aspects related to MOX fuel fabrication in Belgium, 20:7703 (RA;XA)

FUEL FEEDING SYSTEMS
Combustion of pulverized coal in vortex structures. Quarterly progress report number 4, July 1–September 30, 1994, 20:7177 (R;US)

FUEL GAS
See also NATURAL GAS
Combustion experiments of fuel gases in atmospheric fluidized bed combustor test rig, 20:7186 (R;FI)
Development of high efficient process for simultaneous removal of SOx and NOx from flue gas (III), 20:7970 (R;KR;In Korean)
High temperature electrochemical separation of H_2S from coal gasification process streams. Quarterly progress report, July 1, 1994–September 30, 1994, 20:7132 (R;US)
High temperature elkectrochemical polishing of H_2S from coal gasification process streams. Quarterly progress report, August 1, 1994–September 30, 1994, 20:7139 (R;US)
Hot coal gas desulfurization with manganese-based sorbents. Final report, September 1992–December 1994, 20:7104 (R;US)

FUEL MANAGEMENT
Development of a nuclear fuel reload pattern design system based on heuristic search methods, 20:7645 (RA;XA)
Review of neutron radiographic applications in industrial and biological systems, 20:7534 (R;PK)

FUEL OILS
See also HEATING OILS
Winter fuels report. Week ending: January 20, 1995, 20:7885 (R;US)

FUEL PELLETS
Process monitoring using a Quality and Technical Surveillance Program, 20:8077 (R;US)

FUEL PLATES
Postirradiation examination of a low enriched U_3Si_2-Al fuel element manufactured and irradiated at Batan, Indonesia, 20:7762 (R;US)

FUEL POOLS
See FUEL STORAGE POOLS

FUEL REPROCESSING PLANTS
Addendum 3 to CSAR 80-027, Use of calorimeter 109B for fissile material measurement, 20:8246 (R;US)
Application of active neutronic interrogation method to the line analysis in reprocessing plant, 20:7264 (R;FR;In French)
French engineering design rules for safe handling and storage of plutonium, 20:7279 (RA;XA)
Operational safety in plutonium processing workshops at the La Hague site, 20:7275 (RA;XA)
Plutonium Finishing Plant safety evaluation report, 20:7469 (R;US)
Report of clean out and flushing of UO_3 Plant processing equipment: Revision 1, 20:7492 (R;US)

FUEL ROD CONSOLIDATION
See FUEL RODS

FUEL RODS
Material unaccounted for at the Southwest Experimental Fast Oxide Reactor: The SEFOR MUF, 20:7764 (R;US)

FUEL SLUGS
See FUEL RODS

FUEL SLURRIES
Effect of coal beneficiation process on rheology/atomization of coal water slurries. Quarterly progress report, August 1–October 31, 1994, 20:7143 (R;US)

FUEL STORAGE POOLS
Accelerated characterization of metal fuel stored in the Hanford K basins, 20:7372 (R;US)
Evaluation of storing Shippingport Core II spent blanket fuel assemblies in the T Plant PWR Core II fuel pool without active cooling, 20:7666 (R;US)
Interim essential and support drawing list for K Basins, 20:7284 (R;US)
Sealed canister liquid sampling for fuel characterization shipments, 20:8636 (R;US)

FUEL SUBSTITUTION
Alternatives to traditional transportation fuels 1993, 20:8011 (R;US)

FUEL SUPPLIES
Tax revenue and innovations in natural gas supply: New Mexico, 20:7251 (R;US)

FUEL SUSPENSIONS
See FUEL SLURRIES

FUEL SYSTEMS
See also FUEL FEEDING SYSTEMS
Residential fuel quality study (Part II), 20:7953 (RA;US)

FUELS
See also AUTOMOTIVE FUELS
FOSSIL FUELS
FUEL SLURRIES
NUCLEAR FUELS
REFUSE DERIVED FUELS
SYNTHETIC FUELS
THERMONUCLEAR FUELS
WOOD FUELS
Characterization of soot particles by in situ measurement with different aerosol analysis tools, 20:8477 (RA;FI)

FUELS (NUCLEAR)
See NUCLEAR FUELS

FUELWOOD
See WOOD FUELS

FULCRUM OPERATION
See NUCLEAR EXPLOSIONS
UNDERGROUND EXPLOSIONS

FULLERENES
A photoemission study of the diamond and the single crystal C_{60}, 20:8150 (R;US)
Disilene Addition to C_{70}, 20:8193 (R;US)
Effect of He pressure on the superconducting transition temperatures of Na_2CsC_{60} and $(NH_3)_4Na_2CsC_{60}$, 20:8147 (R;US)
Ionization in liquids [annual] progress report, 1993–1994, 20:8200 (R;US)
Ionization in liquids. Progress report, November 1, 1990–October 31, 1993, 20:8199 (R;US)
The effect of O_2 intercalation on the rotational dynamics and the ordering transition of C_{60}, 20:8175 (R;US)
The interactions of high-energy, highly charged Xe ions with buckyballs, 20:8958 (R;US)
[Ionization in liquids: Request for 1992–1993 funding and 1991–1992 progress report], 20:8198 (R;US)

FUMES
See AEROSOLS

FUNCTIONS
See also POLYNOMIALS
STRUCTURE FUNCTIONS
On the degree of approximation by Jackson type operators, 20:8678 (R;XA)

FUNDAMENTAL PARTICLES
See ELEMENTARY PARTICLES

FURNACE OIL
See HEATING OILS
FURNACES
See also ELECTRIC FURNACES
OIL FURNACES
Melter feed tank operating map from the FA-10.02 test data, 20:7434 (R;US)
FUSILEER OPERATION
See NUCLEAR EXPLOSIONS
UNDERGROUND EXPLOSIONS
FUSION ENERGY
See THERMONUCLEAR REACTORS
FUSION FUELS
See THERMONUCLEAR FUELS
FUSION REACTIONS
See HEAVY ION FUSION REACTIONS
FUSION REACTORS
See THERMONUCLEAR REACTORS
FUZZY LOGIC
Simulation and stability testing of the fuzzy control of an implant welding unit, 20:8079 (R;DE;In German)
FW-STOIC PROCESS
See COAL GASIFICATION

G

G CODES
GPP user's guide - a general-purpose postprocessor for wind turbine data analysis, 20:7622 (R;US)
GADOLINIUM COMPOUNDS
The study of free electrons role on creation of magnetic phases in intermetallic compounds of Gd Al_2, Gd_2 In, and La_2 Al, 20:8088 (IA;IR;In English, Persian)
GALAXIES
A survey of surveys, 20:8689 (R;US)
The influence of CDM on the dynamical estimate of Ω in the local neighborhood, 20:8703 (R;US)
GALLIUM 61
Nuclear data sheets update for A = 61, 20:8851 (RA;CN)
GALLIUM ARSENIDE SOLAR CELLS
GaAsSb-based heterojunction tunnel diodes for tandem solar cell interconnects, 20:7593 (R;US)
GALLIUM ARSENIDES
Electron induced conductivity in argon ion implanted GaAs, 20:8097 (IA;RU;In Russian)
Raman study of damage processes in Si^+-implanted GaAs, 20:8992 (R;US)
GALLIUM PHOSPHIDES
A study of luminescence and absorption spectra of GaP, 20:8955 (R;XA)
GAMMA DOSIMETRY
ESR-TRIS system as a gamma dosimeter., 20:8373 (IA;MX)
Early operating experience with large-area germanium detectors for detecting low-energy photons, 20:8633 (R;US)
GAMMA LOGGING
Calibration of the radionuclide logging system germanium detector, 20:8410 (R;US)
CsI(Tl) with photodiodes for identifying subsurface radionuclide contamination, 20:8409 (R;US)
GAMMA RADIATION
Characterization of MMA/LDPE copolymer films obtained by gamma radiation., 20:8206 (IA;MX)
Elastic scattering cross-sections of 11.4 MeV photons from $^{206,207,208}Pb$, ^{209}Bi and ^{181}Ta, 20:8910 (RA;IL)
Elimination of organics chemicals in aqueous solutions by gamma radiation processing., 20:8205 (IA;MX)
New analysis of elastic photon scattering from ^{209}Bi, 20:8909 (RA;IL)
Reduction of phenols, detergents and coliform bacteria in samples of waste water by gamma radiation processing., 20:8208 (IA;MX)
The influence of ionizing radiation on the formation of polymeric material from aqueous malononitrile., 20:8202 (IA;MX)
GAMMA REACTIONS
See PHOTONUCLEAR REACTIONS
GAMMA SPECTROMETERS
The calibration facilities of gamma-ray spectrometer oil logging system, 20:8342 (R;CN;In Chinese)
GAMMA SPECTROSCOPY
Determining uranium enrichment by gamma spectrometry., 20:8158 (IA;MX)
GAMMA TRANSPORT THEORY
EGS4 in '94: A decade of enhancements, 20:8950 (R;US)
GAMMEL-BRUECKNER POTENTIAL
See NUCLEON-NUCLEON POTENTIAL
GAS BURNERS
Study of the effects of ambient conditions upon the performance of fan powered, infrared, natural gas burners. Quarterly technical progress report, September 1–September 30, 1994, 20:7257 (R;US)
GAS COOLANTS
See GASES
GAS ENGINES
See INTERNAL COMBUSTION ENGINES
GAS FLOW
A domain decomposition study of massively parallel computing in compressible gas dynamics, 20:8255 (R;US)
GAS HEAT PUMPS
Gas cooling - a worldwide overview, 20:7995 (RA;US)
GAS TRACK DETECTORS
Low-pressure micro-strip gas chamber and a search for a high-efficiency secondary-electron emitter, 20:8347 (R;US)
GAS WELLS
See NATURAL GAS WELLS
GASEOUS EFFLUENTS
See GASEOUS WASTES
GASEOUS WASTES
See also FLUE GAS
Quality Assurance Project Plan for Facility Effluent Monitoring Plan activities, 20:8518 (R;US)
GASES
See also AIR
COAL GAS
COMPRESSED GASES
ELECTRON GAS
FUEL GAS
SYNTHESIS GAS
VAPORS
High temperature gas filtration, 20:7636 (RA;FI)
National standard and code compliance for electrical equipment installed in hazardous locations for the void fraction instrument, 20:7396 (R;US)
GASIFICATION
See also COAL GASIFICATION
JALO - Fuel conversion. Final report on the energy research programme 1988-1992, 20:7547 (R;FI)
GASOHOL
The Energy Information Administration's assessment of reformulated gasoline: An update, 20:7238 (R;US)
GASOLINE
Development of a dedicated ethanol ultra-low emission vehicle (ULEV) system design, 20:8064 (R;US)
The Energy Information Administration's assessment of reformulated gasoline: An update, 20:7238 (R;US)
GASOLINE ENGINES
See INTERNAL COMBUSTION ENGINES
GATING CIRCUITS
Ultrafast, high precision gated integrator, 20:8269 (R;US)
GAUGE INVARIANCE
Chiral gauge theory in four dimensions, 20:8752 (R;AU)
What's wrong with anomalous chiral gauge theory?, 20:8748 (R;AU)
GAUGE TRANSFORMATIONS
See GAUGE INVARIANCE
GE SEMICONDUCTOR DETECTORS
See also HIGH-PURITY GE DETECTORS
LI-DRIFTED GE DETECTORS

Design (Ge-BGO+NaI(Tl)) of Anti-Compton Spectrometer, 20:8385 (R;XJ;In Russian)

GE(LI) DETECTORS
See LI-DRIFTED GE DETECTORS

GELS
Design of supramolecular ordered systems for mesoscopic colloids and molecular composites. Progress report, November 10, 1993–June 10, 1994, 20:8138 (R;US)

GENE AMPLIFICATION
See also POLYMERASE CHAIN REACTION
Use of labeled primers for differential display, 20:8572 (R;US)

GENE LOCI
See GENES

GENERAL CIRCULATION MODELS
Global ocean circulation and equator-pole heat transport as a function of ocean GCM resolution, 20:8548 (R;US)
Parallel processing of atmospheric chemistry calculations: Preliminary considerations, 20:8458 (R;US)

GENERAL RELATIVITY THEORY
See also RELATIVITY THEORY
Integrals of motion in the two Killing vector reduction of general relativity, 20:8740 (R;AU)

GENERATORS (ELECTRIC)
See ELECTRIC GENERATORS

GENERATORS (STEAM)
See STEAM GENERATORS

GENES
Estimation of protein coding density in a corpus of DNA sequence data, 20:8575 (RA;US)
Molecular characterization of a maize regulatory gene. Final Progress report, November 1992–March 14, 1994, 20:8580 (R;US)
Molecular characterization of a maize regulatory gene. Progress report, July 1989–March 1990, 20:8579 (R;US)

GENETIC MAPPING
ELSI Bibliography: Ethical, legal and social implications of the Human Genome Project. 1994 Supplement, 20:8578 (R;US)
Human Genome News: Workshop on sequencing by hybridization, 20:8577 (R;US)
Improvement and automation of ligation-mediated genomic sequencing. Final report, 20:8581 (R;US)
Physical mapping in the presence of errors: The chimeric clones problem, 20:8576 (RA;US)
Workshop on identification of transcribed sequences. Final report, August 15, 1993–August 14, 1994, 20:8583 (R;US)

GEOCHEMISTRY
Field-based tests of geochemical modeling codes using New Zealand hydrothermal systems, 20:7365 (R;US)
The structure of conceptual models with application to the Aespoe HRL project, 20:7359 (R;SE)

GEOLOGIC FISSURES
Analysis of in-situ rock joint strength using digital borehole scanner images, 20:8651 (R;US)

GEOLOGIC FORMATIONS
Transport in porous and fractured media of the Creede Formation, 20:7606 (R;US)

GEOLOGIC FRACTURES
Contaminant migration in rock aquifers, 20:7331 (R;SE)
Progress on flow visualization and relative permeability measurement in transparent replicas of natural fractures from Yucca Mountain, 20:7330 (R;US)
Simulation studies to evaluate the effect of fracture closure in the performance of naturally fractured reservoirs. Third quarterly progress report, 20:7196 (R;US)
Simulation studies to evaluate the effect of fracture closure on the performance of naturally fractured reservoirs. Annual report, 20:7198 (R;US)
Tectonic framework of the Hanoe Bay area, southern Baltic Sea, 20:8514 (R;SE)

GEOLOGIC JOINTS
See GEOLOGIC FISSURES

GEOLOGIC SURVEYS
Addressing the environmental burden remained after uranium surveying, mining and milling, 20:7448 (IA;CZ;In Czech)

GEOLOGICAL SURVEYS
See GEOLOGIC SURVEYS

GEOTHERMAL ENERGY
Field investigations examining the impact of supersaturated vapor expansions on turbine performance, 20:7608 (R;US)
Geothermal Program Review 12: Geothermal Energy and the President's Climate Change Action Plan, 20:7607 (R;US)

GERMAN DEMOCRATIC REPUBLIC
See FEDERAL REPUBLIC OF GERMANY

GERMAN DR ORGANIZATIONS
See GERMAN FR ORGANIZATIONS

GERMAN FEDERAL REPUBLIC
See FEDERAL REPUBLIC OF GERMANY

GERMAN FR ORGANIZATIONS
FIGAWA. Annual report 1991, 20:7901 (I;DE;In German)

GERMANIUM DETECTORS
See GE SEMICONDUCTOR DETECTORS

GERMANY
See FEDERAL REPUBLIC OF GERMANY

GERMANY (DEMOCRATIC REPUBLIC)
See FEDERAL REPUBLIC OF GERMANY

GERMANY (FEDERAL REPUBLIC)
See FEDERAL REPUBLIC OF GERMANY

GEYSERS GEOTHERMAL FIELD
Seismic monitoring at the Geysers Geothermal Field, 20:7605 (R;US)

GLASS
Gamma radiation effects on some optical glasses, 20:8402 (RA;IL)

GLASS MELTERS
See CERAMIC MELTERS

GLOBAL CLIMATE CHANGE
See CLIMATIC CHANGE

GLOBAL WARMING
See GREENHOUSE EFFECT

GLOW DISCHARGES
Action of glow discharge on organic solids: primary radiation-chemical processes, formation of radical distribution, radical reactions and application., 20:8203 (IA;MX)

GLUON MODEL
On approach to double asymptotic scaling at low x, 20:8760 (R;XA)

GLUONS
A measurement of quark and gluon jet differences at the Z^0 resonance, 20:8807 (R;US)
Comparison of gluon jets and quarks jets, 20:8794 (IA;IR;In English, Persian)
Measurement of the SS-OS Dijet cross-section ratio, 20:8785 (R;US)

GLYCERIN
See GLYCEROL

GLYCEROL
Analysis of glycerin waste in A-Area sanitary treatment facility material, 20:7436 (R;US)

GOBAR GAS
See METHANE

GOLD 197 REACTIONS
Search for strangelets and other rare objects in Au + Pt collisions at the AGS using a fixed-angle focusing spectrometer, 20:8879 (R;US)

GOLD 197 TARGET
Neutron scattering studies in the actinide region. Progress report, August 1, 1991–July 31, 1994, 20:8906 (R;US)

GOLD ALLOYS
Study of point defects and matter transport in cubic face centered concentrated alloys, 20:8073 (R;FR;In French)

GRAIN ALCOHOL
See ETHANOL

GRAIN SIZE
Crystallite size distribution in the synthesis of γ - $LiAlO_2$, 20:8187 (IA;MX)

GRAMINEAE
The photosynthetic acclimation of Lolium perenne growing in a free-air CO_2 enrichment (FACE) system, 20:8585 (R;US)

GRAND GULF-1 REACTOR
Risk contribution from low power, shutdown, and other operational modes beyond full power, 20:7650 (R;US)
GRAND GULF-2 REACTOR
Risk contribution from low power, shutdown, and other operational modes beyond full power, 20:7650 (R;US)
GRANULAR BED FILTERS
Moving granular bed filter research at Delft University of Technology, 20:7141 (RA;FI)
GRANULAR MATERIALS
Blast furnace granular coal injection project. Annual report, January–December 1993, 20:7169 (R;US)
GRAPHITE
Calculation of thermal neutron scattering law for anisotropic microcrystals, 20:8944 (RA;CN)
Compatibility of graphite with a martensitic-ferritic steel, an austenitic stainless steel and a Ni-base alloy up to 1250 C, 20:9108 (R;DE)
Method of fabricating silicon carbide coatings on graphite surfaces, 20:8129 (PA;US)
Strength and elastic properties of some graphites, carbon/carbon and SiC/SiC composite materials, 20:8142 (R;DE;In German)
GRAPHITE MODERATOR
See GRAPHITE
GRASS
See GRAMINEAE
GRAVITONS
Electromagnetic-gravitational conversion cross sections in external electromagnetic fields, 20:8757 (R;XA)
GREAT BRITAIN
See UNITED KINGDOM
GREAT LAKES REGION
See USA
GREAT PLAINS
See USA
GREELEY EVENT
See NUCLEAR EXPLOSIONS
UNDERGROUND EXPLOSIONS
GREENHOUSE EFFECT
Investigation of technologies for CO_2 separation, fixation and disposal for the prevention of global warming, 20:8456 (R;KR;In Korean)
GREENHOUSE GASES
A Sturdy on Environmemtal Pollution Control in the Energy Field, 20:8457 (R;KR;In Korean)
Microphysical and compositional influences on shortwave radiative forcing of climate by sulfate aerosols, 20:8431 (R;US)
GREENHOUSES
Development of the basis technique for the Local Energy, 20:7602 (R;KR;In Korean)
GROUND SUBSIDENCE
Management of dry flue gas desulfurization by-products in underground mines. Annual report, October 1993–September 1994, 20:7153 (R;US)
GROUND WATER
Chemical Analysis
P-Area Acid/Caustic Basin groundwater monitoring report: Third quarter 1994, 20:8521 (R;US)
Sanitary Landfill groundwater monitoring report: Third quarter 1994, 20:8522 (R;US)
Chromates
New method for cleaning ground water which contains chromate, 20:8502 (RA;DK;In Danish)
Classification
Classification of groundwater at the Nevada Test Site, 20:8471 (R;US)
Colloids
Colloid properties in groundwaters from crystalline formations, 20:8513 (R;CH)
Contamination
Development of a three-dimensional groundwater flow model for Western Melton Valley: Application of P-FEM on a DOE waste site, 20:7451 (R;US)
Ground water impact assessment report for the 216-B-3 Pond system, 20:7455 (R;US)
Decontamination
Limited field investigation report for the 100-HR-3 operable unit, 20:7303 (R;US)
Limited field investigation report for the 100-KR-1 operable unit, 20:7304 (R;US)
Pilot-scale treatability test plan for the 100-HR-3 operable unit, 20:7306 (R;US)
Pilot-scale treatability test plan for the 200-BP-5 operable unit, 20:7305 (R;US)
Fluid Flow
Energy and Technology Review, 20:9129 (R;US)
Identification of potential groundwater flow paths using geological and geophysical data, 20:8650 (R;US)
Water levels in wells J-11 and J-12, 1989-91, Yucca Mountain Area, Nevada, 20:7454 (R;US)
Hydrology
Evolution of patterns of regional groundwater flow in southeastern New Mexico: Response to post-Pleistocene changes in climate, 20:7294 (R;US)
Meetings
Research projects on ground water pollution, 20:8505 (R;DK;In Danish, English)
Winter meeting on ground water pollution, 20:8500 (R;DK;In Danish)
Monitoring
Environmental monitoring plan, July 1–December 31, 1994, 20:7855 (R;US)
Environmental monitoring report, May 10, 1993–June 1, 1994, 20:7854 (R;US)
F-Area Acid/Caustic Basin groundwater monitoring report: Third quarter 1994, 20:8520 (R;US)
Metallurgical Laboratory Hazardous Waste Management Facility groundwater monitoring report. Third quarter, 1994, 20:7463 (R;US)
Mixed Waste Management Facility groundwater monitoring report. Second quarter 1994, 20:8519 (R;US)
P-Area Acid/Caustic Basin groundwater monitoring report: Third quarter 1994, 20:8521 (R;US)
Sanitary Landfill groundwater monitoring report: Third quarter 1994, 20:8522 (R;US)
Pollutants
Organic micro-pollutions in ground water resources, cleaning and water usage, 20:8501 (RA;DK;In Danish)
Pumping
Tritium tracer movement as an analogy for pump and treat remediation, 20:7485 (R;US)
Quantitative Chemical Analysis
P-Area Acid/Caustic Basin groundwater monitoring report, second quarter 1994, 20:7507 (R;US)
Radionuclide Migration
Development of hydrogeological modelling approaches for assessment of consequences of hazardous accidents at nuclear power plants, 20:8499 (R;US)
F-Area Acid/Caustic Basin groundwater monitoring report: Third quarter 1994, 20:8520 (R;US)
Mixed Waste Management Facility groundwater monitoring report. Second quarter 1994, 20:8519 (R;US)
Non-Salado flow and transport position paper. Revision 1, 20:7293 (R;US)
Three-dimensional conceptual model for the Hanford Site unconfined aquifer system: FY 1994 status report, 20:8512 (R;US)
Remedial Action
Limited field investigation report for the 100-HR-3 operable unit, 20:7303 (R;US)
Pilot-scale treatability test plan for the 100-HR-3 operable unit, 20:7306 (R;US)
Pilot-scale treatability test plan for the 200-BP-5 operable unit, 20:7305 (R;US)
Uses
Outdoor air and groundwater as natural sources for cooling, 20:8000 (RA;US)

Water Chemistry
P-Area Acid/Caustic Basin groundwater monitoring report, second quarter 1994, 20:7507 (R;US)
Water Pollution
Metallurgical Laboratory Hazardous Waste Management Facility groundwater monitoring report. Third quarter, 1994, 20:7463 (R;US)
Research projects on ground water pollution, 20:8505 (R;DK;In Danish, English)
Water Treatment
Tritium tracer movement as an analogy for pump and treat remediation, 20:7485 (R;US)
GROUND-WATER RESERVES
See AQUIFERS
GROUP THEORY
Equivalence of two non-commutative geometry approaches, 20:8723 (R;XA)
GROWTH (CRYSTAL)
See CRYSTAL GROWTH
GROWTH (ECONOMIC)
See ECONOMIC DEVELOPMENT
GULF COAST
See US GULF COAST
GULF OF MEXICO
Assist in the recovery of bypassed oil from reservoirs in the Gulf of Mexico. Quarterly status report (final), July 1–September 30, 1994, 20:7201 (R;US)

H

HABITAT
Blue Creek Winter Range: Wildlife Mitigation Project. Final environmental assessment, 20:7579 (R;US)
HADRON REACTIONS
Mechanisms of High Energy Hadron-Nucleus and Nucleus-Nucleus Collision Processes, 20:8874 (R;XJ)
Observations of Fast Hadron Passages through Intranuclear Matter, 20:8875 (R;XJ)
HADRON-HADRON INTERACTIONS
The Mechanism of Particle Production Process in Hadron-Nucleon Collisions, 20:8797 (R;XJ)
HADRONIC PARTICLE DECAY
A measurement of the left-right, forward-backward asymmetry for charm quarks using D^{*+} and D^{+} mesons, 20:8816 (R;US)
Measurement of α_s from hadronic event observables at the Z^0 resonance, 20:8804 (R;US)
Measurement of α_s from hadronic event observables at the Z^0 resonance, 20:8809 (R;US)
Measurement of α_s from hadronic event observables at the Z^0 resonance, 20:8804 (R;US)
Measurement of α_s from hadronic event observables at the Z^0 resonance, 20:8809 (R;US)
Measurement of the charged multiplicity of $Z^0 \rightarrow b\bar{b}$ events, 20:8811 (R;US)
Multiplicity moments in e^+e^- annihilation into hadrons at the Z^0 resonance, 20:8810 (R;US)
The left-right forward-backward asymmetry of heavy quarks measured with jet charge and with leptons at the SLD, 20:8815 (R;US)
HAFNIUM
Evaluation of hafnium neutron cross sections, 20:8890 (RA;CN)
HAFNIUM 180
Study on the (γ, γ') reactions with population of high spin ^{180m}Hf, ^{190m}Os and ^{204m}Pb isomers, 20:8920 (IA;RU;In Russian)
HALFBEAK EVENT
See NUCLEAR EXPLOSIONS
UNDERGROUND EXPLOSIONS
HALL EFFECT
Complex scattering dynamics and the quantum Hall effects, 20:8681 (R;US)
HALL GENERATORS
See MHD GENERATORS
HALOGEN COMPOUNDS
Fast successive charge captures in the positron spur by halogenated compounds in methanol., 20:8967 (IA;MX)
HALOGENATED ALIPHATIC HYDROCARBONS
See also CHLORINATED ALIPHATIC HYDROCARBONS
The conversion of German household-appliance refrigeration industry from CFC's to hydrocarbons and fluorocarbons in 1993, 20:8003 (RA;US)
HAM
See MEAT
HAMILTON OPERATORS
See HAMILTONIANS
HAMILTONIANS
Approximate analytic diagonalization of lattice QCD, 20:8773 (R;AU)
New Tensor Interactions in μ - Decay, 20:8799 (R;XJ)
The iteration formula of the Maslov-type index theory with applications to nonlinear Hamiltonian systems, 20:8674 (R;XA)
HANDBOOKS
See MANUALS
HANDCAR EVENT
See NUCLEAR EXPLOSIONS
UNDERGROUND EXPLOSIONS
HANDLEY EVENT
See NUCLEAR EXPLOSIONS
UNDERGROUND EXPLOSIONS
HANDLING (WASTES)
See WASTE MANAGEMENT
HANFORD RESERVATION
Detection and quantitative analysis of ferrocyanide and ferricyanide: FY 93 Florida State University Raman spectroscopy report, 20:8178 (R;US)
Buildings
Load test of the 277W Building high bay roof deck and support structure, 20:7494 (R;US)
Economic Development
Economic transition FY 1995 Multi-Year Program Plan (MYPP)/Fiscal Year Work Plan (FYWP) WBS 7.4.9, 20:9152 (R;US)
Electromagnetic Surveys
Geophysical investigation of 216-U-8 clay vitrified pipe transfer line, 200 West Area, 20:7456 (R;US)
Emergency Plans
T Plant hazards assessment, 20:7495 (R;US)
Environmental Quality
Environmental Monitoring Plan, United States Department of Energy, Richland Operations Office. Revision 1, 20:7444 (R;US)
Fire Fighting
Acceptance test procedure for the MO-294 Building, 20:7373 (R;US)
Fuel Reprocessing Plants
Plutonium Finishing Plant safety evaluation report, 20:7469 (R;US)
Report of clean out and flushing of UO_3 Plant processing equipment: Revision 1, 20:7492 (R;US)
Fuel Storage Pools
Interim essential and support drawing list for K Basins, 20:7284 (R;US)
Sealed canister liquid sampling for fuel characterization shipments, 20:8636 (R;US)
Geochemical Surveys
Calibration of the radionuclide logging system germanium detector, 20:8410 (R;US)
CsI(Tl) with photodiodes for identifying subsurface radionuclide contamination, 20:8409 (R;US)
Information Retrieval
Search Hanford accessible reports electronically system configuration management plan, 20:7287 (R;US)
Information Systems
Search Hanford accessible reports electronically system configuration management plan, 20:7287 (R;US)
Laboratories
Hanford analytical sample projections FY 1995–FY 2000. Revision 1, 20:7413 (R;US)

The Environmental and Molecular Sciences Laboratory project – Continuous evolution in leadership, 20:7487 (R;US)

Program Management

Quality assurance FY 1995 site support program plan WBS 6.7.2.5, 20:7424 (R;US)

Radioactive Waste Disposal

Leachate storage transport tanker loadout piping, 20:7382 (R;US)

Tank vapor mitigation requirements for Hanford Tank Farms, 20:7387 (R;US)

Radioactive Waste Facilities

242-A Evaporator Condensate Tank (TK-C-100) tie down evaluation, 20:7499 (R;US)

242-A Evaporator ion exchange column (IX-D-1) tie down evaluation, 20:7391 (R;US)

BCP selector valves and limit switches, 20:7381 (R;US)

Direct measurements of transport properties are essential for site characterization, 20:7452 (R;US)

Operability test procedure for the 340-NT-EX stack upgrades – Project W337, 20:7458 (R;US)

Tank Waste Remediation System tank waste pretreatment and vitrification process development testing requirements assessment, 20:7411 (R;US)

Wind and seismic analysis for liquid-level gauge support, 20:7395 (R;US)

Radioactive Waste Management

200 Area TEDF interface control document, 20:7383 (R;US)

200 Area treated effluent disposal facility operational test specification, 20:7374 (R;US)

A chemical model for the major electrolyte components of the Hanford waste tanks. The binary electrolytes in the system: $Na\text{-}NO_3\text{-}NO_2\text{-}SO_4\text{-}CO_3\text{-}F\text{-}PO_4\text{-}OH\text{-}Al(OH)_4\text{-}H_2O$, 20:7348 (R;US)

Accelerated characterization of metal fuel stored in the Hanford K basins, 20:7372 (R;US)

Acceptance test procedure for the MO-294 Building, 20:7373 (R;US)

Acceptance test procedure, 241-SY-101 Flexible Receiver System, Phase III testing, 20:7392 (R;US)

Analysis of radioactive waste samples by ion chromatography-ICP/MS, 20:7352 (R;US)

Comparative study of Total Organic Carbon (TOC) methods for high-level mixed waste, 20:7346 (R;US)

Criticality safety evaluation report for K Basin filter cartridges, 20:7376 (R;US)

Criticality safety evaluation report for the 100 KE Basin sandfilter backwash pit, 20:7375 (R;US)

Decision and systems analysis for underground storage tank waste retrieval systems and tank waste remediation system, 20:7364 (R;US)

Distributions of 12 elements on 64 absorbers from simulated Hanford Neutralized Current Acid Waste (NCAW), 20:7323 (R;US)

Evaluation of AY/AZ tank farm ventilation system during aging waste retrieval operations, 20:7412 (R;US)

Evaluation of storing Shippingport Core II spent blanket fuel assemblies in the T Plant PWR Core II fuel pool without active cooling, 20:7666 (R;US)

Evaporation analysis for Tank SX-104, 20:7399 (R;US)

Historical Tank Content Estimate for the Northwest Quandrant of the Hanford 200 East Area, 20:7400 (R;US)

Historical Tank Content Estimate for the Southwest Quandrant of the Hanford 200 West Area, 20:7401 (R;US)

Limited field investigation report for the 100-HR-3 operable unit, 20:7303 (R;US)

Limited field investigation report for the 100-KR-1 operable unit, 20:7304 (R;US)

Pilot-scale treatability test plan for the 100-HR-3 operable unit, 20:7306 (R;US)

Pilot-scale treatability test plan for the 200-BP-5 operable unit, 20:7305 (R;US)

Potential tank waste material anomalies located near the liquid observation wells: Model predicted responses of a neutron moisture detection system, 20:7367 (R;US)

Project Specific Quality Assurance Plan (QAPP), 20:7388 (R;US)

Project W-340 long reach arm retrieval system balance of plant instrumentation workshop engineering study, 20:7389 (R;US)

Purex canyon exhaust fan bearing temperature monitoring system doric 245 datalogger programming, 20:7408 (R;US)

Results of falling barrier analyses, 20:7378 (R;US)

Rollover analysis of rotary mode core sampler truck No. 2, 20:7501 (R;US)

Sample Exchange Evaluation (SEE) Report - Phase II, 20:7414 (R;US)

Single Shell Tank Waste Characterization Project for Tank B-110, Core 9 - data package and PNL validation summary report, 20:7398 (R;US)

Storage options for Long Length Contaminated Equipment (LLCE) items, 20:7402 (R;US)

Structural evaluation of thermocouple probes for 241-AZ-101 waste tank, 20:7385 (R;US)

Tank 241-C-102 tank characterization plan, 20:7417 (R;US)

Tank 241-TX-105 tank characterization plan, 20:7419 (R;US)

Radioactive Waste Processing

183-H basin sludge treatability testing program plan, 20:7384 (R;US)

Chemistry of proposed calcination/dissolution processing of Hanford Site tank wastes, 20:7369 (R;US)

Low-Level Waste Vitrification Plant Project contracting strategy decision analysis report, 20:7390 (R;US)

Web technology in the separation of strontium and cesium from INEL-ICPP radioactive acid waste (WM-185), 20:7342 (R;US)

Radioactive Waste Storage

241-BY-106 sampling test plan, 20:7420 (R;US)

45-Day safety screening for Tank 241-C-103 push mode sample, riser 2, 20:7500 (R;US)

Accelerated safety analyses - structural analyses Phase I - structural sensitivity evaluation of single- and double-shell waste storage tanks, 20:7407 (R;US)

Ammonia in simulated Hanford double-shell tank wastes: Solubility and effects on surface tension, 20:7339 (R;US)

Characterization of Hanford tank wastes containing ferrocyanides, 20:7345 (R;US)

DACS upgrade acceptance test report, 20:7394 (R;US)

Design criteria for the light duty utility arm system end effectors, 20:7379 (R;US)

High-heat tank safety issue resolution program plan. Revision 2, 20:7489 (R;US)

Inspection system performance test procedure, 20:7393 (R;US)

K Basin spent fuel sludge treatment alternatives study. Volume 1, Regulatory options, 20:7343 (R;US)

K Basin spent fuel sludge treatment alternatives study. Volume 2, Technical options, 20:7344 (R;US)

Light Duty Utility Arm interface control document plan, 20:7380 (R;US)

Soil weight (lbf/ft^3) at Hanford waste storage locations (2 volumes), 20:7409 (R;US)

Tank 241-SY-103 auger samples, risers 7A, 14B and 22A, 20:7397 (R;US)

Tank 41H bounding uranium enrichment. Revision 1, 20:7506 (R;US)

Work plan for upgrading the 241-A-701 compressed air system and motor control center. Revision 1, 20:7423 (R;US)

Radiometric Surveys

Survey speeds to detect one times and three times total contamination values from U.S. Department of Energy Radiological Control Manual, Table 2-2, 20:8398 (R;US)

Remedial Action

Distributions of 15 elements on 58 absorbers from simulated Hanford Double-Shell Slurry Feed (DSSF), 20:7478 (R;US)

Environmental Restoration Program technology baseline plan, 20:7472 (R;US)

Project management plan, Hazardous Materials Management and Emergency Response Training Center, 20:7498 (R;US)

Quality assurance FY 1995 site support program plan WBS 6.7.2.5, 20:7424 (R;US)

Summary report of Hanford Site well remediation and decommissioning activities for fiscal year 1994, 20:7493 (R;US)

Virtual reality and stereoscopic telepresence, 20:7491 (R;US)

Safeguards
T Plant hazards assessment, 20:7495 (R;US)
Spent Fuel Storage
CSER 94-014: Storage of metal-fuel loaded EBR-II casks in concrete vault on PFP grounds, 20:8245 (R;US)
Plutonium Finishing Plant safety evaluation report, 20:7469 (R;US)
Unreviewed safety question evaluation of 100 K West fuel canister gas and liquid sampling, 20:7497 (R;US)
Unreviewed safety question evaluation of 100K East and 100K West in-basin fuel characterization program activities, 20:7496 (R;US)
Stack Disposal
291-B-1 stack monitoring and sampling system annual system assessment report, 20:7459 (R;US)
Storage Facilities
DACS upgrade acceptance test report, 20:7394 (R;US)
Global modeling of Hanford tank waste pretreatment alternatives within a total cleanup system using ASPEN PLUS™, 20:7371 (R;US)
Parametric design using IGRIP, 20:7353 (R;US)
Strategy for sampling Hanford Site tank wastes for development of disposal technology, 20:7410 (R;US)
Test report – Prototype core sampler, 20:7421 (R;US)
Work plan for upgrading the 241-A-701 compressed air system and motor control center. Revision 1, 20:7423 (R;US)
Tanks
Operability test procedure for the TK-900 effluent monitoring station, 20:7406 (R;US)
Trucks
Rollover analysis of rotary mode core sampler truck No. 2, 20:7501 (R;US)
Waste Management
Virtual reality and stereoscopic telepresence, 20:7491 (R;US)
Water Pollution
Ground water impact assessment report for the 216-B-3 Pond system, 20:7455 (R;US)

HARD COAL
See ANTHRACITE
HARMONIC GENERATION
Intensity dependence of the third harmonic generation efficiency for high power far infrared radiation in n-silicon, 20:9075 (R;CH)
HARMONIC OSCILLATORS
Instability of weakly nonlinear chaotic structures, 20:8687 (R;RU)
Method of normal coordinates in the formulation of a system with dissipation: The harmonic oscillator, 20:8667 (R;XA)
On quantization of self-similar systems, 20:8671 (R;XA)
HARRY EVENT
See NUCLEAR EXPLOSIONS
HAZARDOUS MATERIALS
See also TOXIC MATERIALS
Absorption
Distributions of 15 elements on 58 absorbers from simulated Hanford Double-Shell Slurry Feed (DSSF), 20:7478 (R;US)
Biological Effects
Toxicological benchmarks for screening potential contaminants of concern for effects on terrestrial plants: 1994 revision, 20:8640 (R;US)
Classification
Upfront Delisting of F006 Mixed Waste, 20:7440 (R;US)
Detoxification
Overview of solar detoxification activities in the United States, 20:8463 (R;US)
Ecological Concentration
Toxicological benchmarks for screening potential contaminants of concern for effects on terrestrial plants: 1994 revision, 20:8640 (R;US)
Environmental Exposure Pathway
Fall 1994 wildlife and vegetation survey, Norton Air Force Base, California, 20:8511 (R;US)
Environmental Impacts
A comparison of noxious facilities' impacts for home owners versus renters, 20:7848 (R;US)
Environmental Transport
Development of a three-dimensional groundwater flow model for Western Melton Valley: Application of P-FEM on a DOE waste site, 20:7451 (R;US)
Mixed Waste Management Facility groundwater monitoring report. Second quarter 1994, 20:8519 (R;US)
Ground Disposal
FY 1995 Remedial Investigation Work Plan for Waste Area Grouping 2 at Oak Ridge National Laboratory, Oak Ridge, Tennessee, 20:7298 (R;US)
Sampling and analysis of soil from the old F-Area effluent ditch and its surrounding wetlands, 20:7435 (R;US)
Photolysis
Overview of solar detoxification activities in the United States, 20:8463 (R;US)
Pyrolysis
Prospects for pyrolysis technologies in managing municipal, industrial, and DOE cleanup wastes, 20:7542 (R;US)
Remedial Action
Fall 1994 wildlife and vegetation survey, Norton Air Force Base, California, 20:8511 (R;US)
Risk Assessment
Toxicological benchmarks for screening potential contaminants of concern for effects on terrestrial plants: 1994 revision, 20:8640 (R;US)
Transport Regulations
Transportation and packaging resource guide, 20:7282 (R;US)
Vitrification
Development of a Transportable Vitrification System for Mixed Waste, 20:7432 (R;US)
Vitrification of high sulfate wastes, 20:7350 (R;US)
Waste Management
CERCLA §103 and EPCRA §304 Release Notification Requirements update, 20:7852 (R;US)
Environmental Restoration Information Resource Management Program Plan, 20:7474 (R;US)
Ignitable, corrosive, reactive, and incompatible wastes information brief, 20:7851 (R;US)
Medical and biohazardous waste generator's guide: Revision 1, 20:8591 (R;US)
Project management plan, Hazardous Materials Management and Emergency Response Training Center, 20:7498 (R;US)

HCDA
See REACTOR CORE DISRUPTION
HD 8077
See NICKEL BASE ALLOYS
HDO
See HEAVY WATER
HEALTH HAZARDS
See also RADIATION HAZARDS
WAG 2 remedial investigation and site investigation site-specific work plan/health and safety checklist for the sediment transport modeling task, 20:7481 (R;US)
HEALTH PHYSICS
See RADIATION PROTECTION
HEART DISEASE
See CARDIOVASCULAR DISEASES
HEAT DISTRIBUTION SYSTEMS
A study on energy conservation in heat source distribution system(II), 20:7974 (R;KR;In Korean)
De-aeration of feedwater by membrane-technique, 20:8177 (R;SE;In Swedish)
HEAT EXCHANGERS
See also DIRECT CONTACT HEAT EXCHANGERS
Enhanced boiling heat transfer in horizontal test bundles, 20:8022 (R;US)
The stainless steel beneficial reuse integrated demonstration, 20:7428 (R;US)
HEAT PIPES
Silicon heat pipes for cooling electronics, 20:8257 (R;US)
HEAT PUMPS
See also GAS HEAT PUMPS
Absorption technology, 20:7994 (RA;US)

Advanced heat pump for recovery of volatile organic compounds, Phase III - demonstration of BCSRHP mobile regenerator. Final report, 20:8024 (R;US)
Final report, exhaust air heat pump monitoring study, 20:8019 (R;US)
Stirling cycle refrigerators and heat pumps, 20:7997 (RA;US)

HEAT STORAGE DEVICES
See THERMAL ENERGY STORAGE EQUIPMENT

HEAT STORAGE SYSTEMS
See THERMAL ENERGY STORAGE EQUIPMENT

HEAT TRANSFER
See also CONVECTION
Development of the high performance phase change heat transfer system(II), 20:7969 (R;KR;In Korean)

HEAT TRANSFER FLUIDS
Development of advanced low-temperature heat transfer fluids for district heating and cooling, final report, 20:8249 (R;US)
Increased energy capacity in district heating fluids, 20:8051 (RA;SE)

HEAT TRANSMISSION
See HEAT TRANSFER

HEATER OIL
See HEATING OILS

HEATING
See also DISTRICT HEATING
SPACE HEATING
A study on retrofit measures of KIER buildings for energy conservation, 20:7967 (R;KR;In Korean)

HEATING OILS
Catalase as an indicator of microbial contamination in fuel oil, 20:7954 (RA;US)
Design study for advanced flame quality indicator, 20:7956 (RA;US)
Part I - Oil heat technology research and development. Part II - NAECA 2002, what, when, and who?, 20:7947 (RA;US)
Premium performance heating oil, 20:7955 (RA;US)
Winter fuels report, 20:7235 (R;US)
Winter fuels report. Week ending: January 20, 1995, 20:7885 (R;US)

HEATING SYSTEMS
Development of advanced low-temperature heat transfer fluids for district heating and cooling, final report, 20:8249 (R;US)
Part I - Oil heat technology research and development. Part II - NAECA 2002, what, when, and who?, 20:7947 (RA;US)

HEAVY ION ACCELERATORS
See also BROOKHAVEN RHIC
Elise - the next step in development of induction heavy ion drivers for inertial fusion energy, 20:9123 (R;US)

HEAVY ION FUSION REACTIONS
JINR Heavy Ion Program of Low and Medium Energies, 20:8929 (R;XJ)

HEAVY ION REACTIONS
See also CARBON 12 REACTIONS
COPPER 65 REACTIONS
GOLD 197 REACTIONS
OXYGEN 16 REACTIONS
Interferometry of hard photons in heavy-ion collisions, 20:8829 (R;FR;In French)
Shock compression and expansion in central collisions, 20:8908 (R;US)
The structure of a source from interferometry measurements in heavy ion collisions, 20:8911 (R;XA)
Twenty five years of clusters – from Bochum to Strasbourg, 20:8845 (R;US)

HEAVY NUCLEI
See also BISMUTH 209
LEAD 204
LEAD 207
LEAD 208
OSMIUM 190
RADON 222
THALLIUM 203
THALLIUM 205
Photofission of nuclei at low excitation energies, 20:8918 (IA;RU;In Russian)
Study on the photonuclear reactions with alpha particles and cluster emission in the region of giant dipole resonance, 20:8922 (IA;RU;In Russian)

HEAVY OILS
See PETROLEUM

HEAVY WATER
A feasibility study on the industialization of catalytic process in connection with domestic chemical plants, 20:7518 (R;KR;In Korean)
Three-dimensional study of reactive diatom-diatom system. Quantum mechanical state-to-state cross sections for the H_2+OX->H+OX: X=H,D reactions, 20:8962 (RA;IL)

HEAVY WATER COOLANT
See HEAVY WATER

HEAVY WATER MODERATOR
See HEAVY WATER

HEISENBERG MODEL
A general non-perturbative estimate of the energy density of lattice Hamiltonians, 20:8742 (R;AU)
Effective chiral-spin Hamiltonian for odd-numbered coupled Heisenberg chains, 20:9020 (R;XA)

HELAC
See LINEAR ACCELERATORS

HELIUM
Atomic approaches in metastable antiprotonic helium atoms. REPLY to 'analysis of the lifetimes and fractions of antiprotons trapped in metastable antiprotonic-helium states' by I. Shimamura and M. Kimura, 20:8970 (R;JP)
Cryogenic helium gas convection research, 20:8250 (R;US)

HELIUM 3 REACTIONS
Final State Interactions in ^{3}Hep-Collisions, 20:8934 (R;XJ;In Russian)

HELIUM 4 REACTIONS
See ALPHA REACTIONS

HEMATOPOIETIC SYSTEM
Hematopoietic tissue repair under chronic low daily dose irradiation, 20:8607 (R;US)

HERBICIDES
Extraction and detection of pesticide residues from air filter inserts using supercritical carbon dioxide, 20:8464 (R;US)

HERMITIAN MATRIX
The effect of a non-hermitian crystal potential on the scattering matrix in reflection electron diffraction, 20:9017 (R;AU)

HICHLOR PROCESS
See WASTE PROCESSING

HIGGS BOSONS
Instability of Weak Vacuum, 20:8766 (R;XJ)
Real Higgs singlet and electroweak phase transition in the standard model, 20:8771 (R;AU)
Renormalization group analyses of particle masses in full four-generation fermion condensate scheme, 20:8756 (R;XA)
Top quark and Higgs boson masses from wormhole physics, 20:8841 (R;AU)

HIGGS MODEL
Structure formation with majoron supermultiplet, 20:8759 (R;XA)

HIGH ALLOY STEELS
See also STAINLESS STEELS
Corrosion testing of three highly alloyed stainless steels in hot chlorinated seawater, 20:8110 (R;SE;In Swedish)

HIGH ENERGY PHYSICS
Massively Parallel Processing. A need for future High Energy Physics experiments., 20:9174 (RA;HU)
Measurement of the magnetically-induced QED birefringence of the vacuum and an improved search for laboratory axions: Technical report. Project definition study of the use of assets and facilities of the Superconducting Super Collider Laboratory, 20:8754 (R;US)
Technology and applications, 20:9173 (R;HU)

HIGH EXPLOSIVES
See CHEMICAL EXPLOSIVES

HIGH FLUX NEUTRON SOURCE FACILITY
See NEUTRON SOURCE FACILITIES

HIGH-BETA PLASMA
On the paraxial equilibrium of the finite β plasma in open magnetic configurations, 20:9041 (R;RU)

HIGH-LEVEL RADIOACTIVE WASTES

Absorption Spectroscopy
Summary of fiscal year 1994 near-infrared spectroscopy moisture sensing activities, 20:7370 (R;US)

Chemical Analysis
A chemical model for the major electrolyte components of the Hanford waste tanks. The binary electrolytes in the system: $Na\text{-}NO_3\text{-}NO_2\text{-}SO_4\text{-}CO_3\text{-}F\text{-}PO_4\text{-}OH\text{-}Al(OH)_4\text{-}H_2O$, 20:7348 (R;US)
Analysis of radioactive waste samples by ion chromatography-ICP/MS, 20:7352 (R;US)
Comparative study of Total Organic Carbon (TOC) methods for high-level mixed waste, 20:7346 (R;US)
Sample Exchange Evaluation (SEE) Report - Phase II, 20:7414 (R;US)

Containers
Application of artificial neural networks for modeling localized corrosion, 20:8229 (RA;XA)

Decontamination
Distributions of 12 elements on 64 absorbers from simulated Hanford Neutralized Current Acid Waste (NCAW), 20:7323 (R;US)

Evaporation
Evaporation analysis for Tank SX-104, 20:7399 (R;US)

Monitored Retrievable Storage
Evaluation of AY/AZ tank farm ventilation system during aging waste retrieval operations, 20:7412 (R;US)

Monitoring
Tank 241-TX-105 tank characterization plan, 20:7419 (R;US)
Tank SY-101 void fraction instrument functional design criteria, 20:7403 (R;US)

Quantitative Chemical Analysis
Criticality safety evaluation report for the 100 KE Basin sandfilter backwash pit, 20:7375 (R;US)

Radioactive Waste Disposal
Computer simulation of radionuclide transport through thermal convection of groundwater from borehole repositories, 20:7327 (R;US)
Non-Salado flow and transport position paper. Revision 1, 20:7293 (R;US)

Radioactive Waste Processing
Distributions of 15 elements on 58 absorbers from simulated Hanford Double-Shell Slurry Feed (DSSF), 20:7478 (R;US)
Project Specific Quality Assurance Plan (QAPP), 20:7388 (R;US)

Radioactive Waste Storage
Acceptance test procedure, 241-SY-101 Flexible Receiver System, Phase III testing, 20:7392 (R;US)
Analysis of radioactive waste samples by ion chromatography-ICP/MS, 20:7352 (R;US)
Comparative study of Total Organic Carbon (TOC) methods for high-level mixed waste, 20:7346 (R;US)
Decontamination and dismantlement of the Argonne National Laboratory-East Map Tube Facility, 20:7468 (R;US)
Development of Liquid Level and Density Bubbler for DWPF Canyon Vessels. Final report, 20:7439 (R;US)
Evaporation analysis for Tank SX-104, 20:7399 (R;US)
Project Specific Quality Assurance Plan (QAPP), 20:7388 (R;US)
Sample Exchange Evaluation (SEE) Report - Phase II, 20:7414 (R;US)
Structural evaluation of thermocouple probes for 241-AZ-101 waste tank, 20:7385 (R;US)

Radiochemical Analysis
Characterization of high-level waste saltcake stored at the Savannah River Site, 20:7425 (R;US)

Retrieval Systems
Evaluation of AY/AZ tank farm ventilation system during aging waste retrieval operations, 20:7412 (R;US)

Rheology
Engineering test plan for Tank 241-SY-101 in situ viscometer. Revision 1, 20:7418 (R;US)

Risk Assessment
Criticality safety evaluation report for the 100 KE Basin sandfilter backwash pit, 20:7375 (R;US)

Salt Caverns
Calculation of the radiation transport in rock salt using Monte Carlo methods. Final report. HAW project, 20:7314 (R;DE)

Sampling
Tank 241-C-102 tank characterization plan, 20:7417 (R;US)

Separation Processes
Chemistry of proposed calcination/dissolution processing of Hanford Site tank wastes, 20:7369 (R;US)

Solidification
High-level waste management technology program plan, 20:7315 (R;US)

Storage Facilities
Results of falling barrier analyses, 20:7378 (R;US)

Tanks
Evaporation analysis for Tank SX-104, 20:7399 (R;US)

Underground Disposal
Field-based tests of geochemical modeling codes using New Zealand hydrothermal systems, 20:7365 (R;US)
Water levels in wells J-11 and J-12, 1989-91, Yucca Mountain Area, Nevada, 20:7454 (R;US)

Underground Storage
A chemical model for the major electrolyte components of the Hanford waste tanks. The binary electrolytes in the system: $Na\text{-}NO_3\text{-}NO_2\text{-}SO_4\text{-}CO_3\text{-}F\text{-}PO_4\text{-}OH\text{-}Al(OH)_4\text{-}H_2O$, 20:7348 (R;US)
A survey of existing and emerging technologies for external detection of liquid leaks at the Hanford Site, 20:7340 (R;US)
Characterization of high-level waste saltcake stored at the Savannah River Site, 20:7425 (R;US)
Evaluation of AY/AZ tank farm ventilation system during aging waste retrieval operations, 20:7412 (R;US)
National standard and code compliance for electrical equipment installed in hazardous locations for the void fraction instrument, 20:7396 (R;US)
Operability test procedure [Tank] 241-SY-101 equipment removal system, 20:7405 (R;US)
Tank 241-C-102 tank characterization plan, 20:7417 (R;US)
Tank 241-TX-105 tank characterization plan, 20:7419 (R;US)

Vitrification
High-level waste management technology program plan, 20:7315 (R;US)
Tank Waste Remediation System tank waste pretreatment and vitrification process development testing requirements assessment, 20:7411 (R;US)

HIGH-PURITY GE DETECTORS
Calibration of the radionuclide logging system germanium detector, 20:8410 (R;US)
The Method of Decay Energy Determination for Short-Lived Nuclei in On-Line Experiments, 20:8382 (R;XJ;In Russian)

HIGH-TC SUPERCONDUCTORS
Cooling rate effects on the microstructure, critical current density, and $T_c$transition of one- and two-powder BSCCO-2223 Ag-sheathed tapes, 20:8115 (R;US)
Defect structure and superconducting properties of $La_{1.8}Sr_xCa_{1.2-x}Cu_2O_{6-\delta}$, 20:8083 (RA;IL)
Dependence of the Josephson coupling of unconventional superconductors on the properties of the tunneling barrier, 20:9027 (R;US)
Device-quality tunnel junctions on the high $T_c$superconductor $HgBa_2CuO_{4+\delta}$, 20:8117 (R;US)
Effects of Bi and Bi_2O_3 additions on the microstructure and superconducting properties of powder-in-tube BSCCO (2212) tapes, 20:8113 (R;US)
High-temperature superconductivity in Switzerland. Perspectives to the year 2000, 20:9032 (I;CH;In German)
Investigation of the magnetic flux vortices structure in high-temperature superconductors, 20:9037 (IA;IR;In English, Persian)
Microstructure and composition of a SNS Josephson junction using $CaRuO_3$ as the metallic barrier, 20:9026 (R;US)

Midwest Superconductivity Consortium: 1994 Progress report, 20:8120 (R;US)
On the theory of hole propagation in an antiferromagnetic background, 20:9035 (R;XA)
Processing of single- and multi-domain $YBa_2Cu_3O_x$ bulk materials for levitation applications by $Nd_{1+x}Ba_{2-x}Cu_3O_y$ seeding, 20:8118 (R;US)
The real structure of columnar pinning centers in heavy-ion-irradiated cuprate superconductors, 20:8119 (R;US)

HIGHWAYS
See ROADS

HITREX-2 REACTOR
See ZERO POWER REACTORS

HL-1 TOKAMAK
Study of impurity concentrations by VUV spectroscopy on HL-1, 20:9043 (R;CN)

HOFFMAN PROCESS
See COAL GASIFICATION

HOLLY EVENT
See NUCLEAR EXPLOSIONS

HOLMIUM 151
Particle-phonon excitations in valence-neutron and valence-proton nuclei around ^{146}Gd, 20:8866 (R;DE;In German)

HOLMIUM COMPOUNDS
Neutron diffraction from $HoNi_2B_2C$. Version 1, 20:8982 (R;US)

HOLOGRAPHY
Theoretical aspects of electron emission holography, 20:8995 (R;XA)

HORDEUM
See BARLEY

HORIZONTAL AXIS TURBINES
Using digital filtering techniques as an aid in wind turbine data analysis, 20:7621 (R;US)
Verification of design basis 2 - a coupled aeroelastic wind turbine model, 20:7624 (R;DK)
Wind turbine test Nordtank NTK 500/37. System test, 20:7623 (R;DK)

HOSPITALS
AFBC co-firing of coal and hospital waste. Quarterly progress report, May 1, 1994–July 31, 1994, 20:8045 (R;US)
Technology transfer 1995, 20:7874 (R;US)

HOT GAS CLEANUP
LIFAC Sorbent Injection Desulfurization Demonstration Project. Quarterly Report No. 16, July-September 1994, 20:7158 (R;US)
LIFAC Sorbent Injection Desulfurization Demonstration Project. Quarterly report No. 15, April–June 1994, 20:7157 (R;US)

HOT WATER
A study on the performance evaluation technique of prefabricated Ondol(II), 20:7964 (R;KR;In Korean)
Energy use and domestic hot water consumption - Phase 1. Final report, 20:7986 (R;US)

HOT WATER HEATERS
See WATER HEATERS

HOUSES
Field measurements of heating efficiency of electric forced-air furnaces in six manufactured homes, 20:7960 (R;US)
Reasonably-priced low energy houses - heat recovery. New, simple system for residential ventilation, 20:7984 (R;NO;In Norwegian)
Toward resolving model-measurement discrepancies of radon entry into houses, 20:8460 (R;US)

HTO
See HEAVY WATER

HUBBARD MODEL
Irreducible Greens' Functions method in the theory of highly correlated systems, 20:9021 (R;XA)

HUGENHOLTZ-PINES THEORY
See HYDROGEN

HUMAN CHROMOSOME 9
Report on the Second International Workshop on Human Chromosome 9, 20:8573 (R;US)

HUMAN FACTORS
The development of human factors experimental evaluation techniques -The development of human factors technologies-, 20:7750 (R;KR;In Korean)

HUMAN POPULATIONS
See also MINORITY GROUPS
Interim report of the Advisory Committee on human radiation experiments, 20:8606 (R;US)
Physical mapping in the presence of errors: The chimeric clones problem, 20:8576 (RA;US)

HUMANS
See HUMAN POPULATIONS

HUSKY ACE EVENT
See NUCLEAR EXPLOSIONS
UNDERGROUND EXPLOSIONS

HUTCH EVENT
See NUCLEAR EXPLOSIONS
UNDERGROUND EXPLOSIONS

HYBRID ELECTRIC-POWERED VEHICLES
Developing a standardized test procedure for hybrid vehicles: The challenge of the SAE HEV task force, 20:8062 (R;US)

HYBRID SYSTEMS
Hourly simulations of hybrid renewable energy systems for San Cristobal/Santa Barbara, Guatemala, 20:8049 (R;US)

HYDRAULIC CONDUCTIVITY
Contribution of environmental isotopes in the hydrogeological study of the Casamance's aquifers (South of Senegal), 20:8485 (RA;XA;In French)

HYDRAULIC RAMS
See PUMPS

HYDROCARBONS
See also ALKANES
NAPHTHALENE
TOLUENE
Deflagration-induced pressure and temperature transients in a waste storage facility, 20:7427 (R;US)
Elimination of organics chemicals in aqueous solutions by gamma radiation processing., 20:8205 (IA;MX)
Off-gas purification by means of membrane vapor separation systems, 20:7244 (R;DE)

HYDROCHLORIC ACID
Rejuvenation and recovery of electroplating acids using the WADR technology, 20:8038 (R;US)

HYDRODYNAMICS
Application of tracer dilution techniques for flow rate measurements in Sahelian Hydrology: Examples in Mali, 20:8533 (RA;XA;In French)

HYDROELECTRIC POWER
Report to the Department of Energy on the DOE/EPSCoR planning activities for the state of South Dakota, 20:8221 (R;US)

HYDROELECTRIC POWER PLANTS
See also SMALL-SCALE HYDROELECTRIC POWER PLANTS
Evaluation of juvenile fish bypass and adult fish passage facilities at water diversions in the Umatilla River. Annual and interim progress report, October 1990–September 1991, 20:7573 (R;US)

HYDROELECTRICITY
See HYDROELECTRIC POWER

HYDROFLUORIC ACID
Magnetic Survey of the Hydroflouric Acid Spill Area, 20:7464 (R;US)
Thermodynamic modeling of hydrogen fluoride production relevant to actinide residue treatment, 20:7263 (R;US)
Three-dimensional quantum mechanical study of exothermic reactive systems ($F+H_2$; $Ar+h^*_2$) employing imaginary arrangement decoupling potentials, 20:8183 (RA;IL)

HYDROGEN
A practical method of hydrogen purification for use in fuel-cell systems, 20:7934 (RA;US)
Development of novel active transport membrande devices, 20:8139 (R;US)
Economic feasibility study: CFR advanced direct coal liquefaction process. Volume 4, 20:7126 (R;US)

Engineering test plan for Tank 241-SY-101 in situ viscometer. Revision 1, 20:7418 (R;US)
Hydrogen content determination in alkali metals, 20:8168 (IA;RU;In Russian)
Improvement of hydrogen solubility and entrainment in hydrocracker feedstocks. Quarterly technical report, July 1, 1994–September 30, 1994, 20:7228 (R;US)
Integral and differential cross sections foe the Li+HF->LiF+H process. A comparison between jz quantum mechanical and experimental results, 20:8185 (RA;IL)
Photochemical reactions of $CuInSe_2$ thin films in sulphuric acid solution., 20:8201 (IA;MX)
Quantum mechanical cross sections for $D+H_2$ and $H+D_2$ reactive systems. Application of the negative imagnibnary potentials within the jz approximation, 20:8184 (RA;IL)
Studies of distribution and combustion of hydrogen in PWR type plants, 20:7794 (RA;DE;In German)
Studies of hydrogen distribution and combustion in PWR plants, 20:7799 (RA;DE;In German)
Study on the hydrogen production and cathodic protection using photovoltaic systems, 20:7965 (R;KR;In Korean)
Study on the interaction of lithium orthosilicate with water vapor and hydrogen, 20:9122 (R;DE;In German)
Tank SY-101 void fraction instrument functional design criteria, 20:7403 (R;US)
Time-resolved EPR studies of the H atom: A stable heavy isotope of muonium, 20:8196 (R;US)
X-ray and neutron scattering from amorphous diamondlike carbon and hydrocarbon films, 20:8989 (R;DK)

HYDROGEN 1 TARGET
Final State Interactions in ^{3}Hep-Collisions, 20:8934 (R;XJ;In Russian)
Polarization Observables for the Collinear dp → ^{3} Heπ^0 Reaction, 20:8927 (R;XJ)

HYDROGEN 2
See DEUTERIUM

HYDROGEN 3
See TRITIUM

HYDROGEN CHLORIDES
See HYDROCHLORIC ACID

HYDROGEN FLUORIDES
See HYDROFLUORIC ACID

HYDROGEN FUEL CELLS
A practical method of hydrogen purification for use in fuel-cell systems, 20:7934 (RA;US)

HYDROGEN HYDROXIDES
See WATER

HYDROGEN ISOTOPES
See also DEUTERIUM
TRITIUM
Three-dimensional reactive quantum mechanical study for the H_2+X_2 (X=H,D,T) systems. Application of negative imaginary arrangement decoupling potentials, 20:8186 (RA;IL)

HYDROGEN NITRATES
See NITRIC ACID

HYDROGEN PRODUCTION
Rate inhibition of steam gasification by adsorbed hydrogen. Quarterly technical progress report, July 1–September 30, 1994, 20:7568 (R;US)

HYDROGEN SULFATES
See SULFURIC ACID

HYDROGEN SULFIDES
Advanced sulfur control concepts in hot-gas desulfurization technology: Phase 1, Feasibility of the direct production of elemental sulfur during the regeneration of high temperature desulfurization sorbents, 20:7107 (R;US)
Generation, detection and characterization of gas-phase transition metal aggregates and compounds. Final technical report, September 15, 1991–July 14, 1994, 20:8181 (R;US)
High temperature electrochemical separation of H_2S from coal gasification process streams. Quarterly progress report, July 1, 1994–September 30, 1994, 20:7132 (R;US)
High temperature elkectrochemical polishing of H_2S from coal gasification process streams. Quarterly progress report, August 1, 1994–September 30, 1994, 20:7139 (R;US)
Simultaneous removal of H_2S and NH_3 in coal gasification processes. Quarterly report, July 1, 1994–September 30, 1994, 20:7109 (R;US)

HYDROLOGY
Contribution to the chemical and environmental isotopic study of the dallol Bosso acquifers (Niger), 20:8481 (RA;XA;In French)
Environmental isotopic study of the Korama aquifers, south of Zinder (Niger), 20:8483 (RA;XA;In French)
Impact of environmental isotopes in the fissured aquifer study in Mali, 20:8482 (RA;XA;In French)
Mobile units to hydro geochemistry characterization, 20:8474 (R;ES;In Spanish)
Natural groundwater recharge in the Garoua basin (North-Cameroon): Hydrochemical and isotopic approaches, 20:8486 (RA;XA;In French)

HYDROTHERMAL CONVECTIVE SYSTEMS
See HYDROTHERMAL SYSTEMS

HYDROTHERMAL SYSTEMS
Field-based tests of geochemical modeling codes using New Zealand hydrothermal systems, 20:7365 (R;US)
Modeling of the fault-controlled hydrothermal ore-forming systems, 20:7328 (R;US)

HYFLEX PROCESS
See COAL GASIFICATION

HYPERCUBE COMPUTERS
DOLIB: Distributed Object Library, 20:9181 (R;US)

HYPERONS
See also OMEGA BARYONS
CP violation in hyperon decays: the case p-bar p → Λ-bar Λ → p-bar π^+ pπ^-, 20:8819 (R;AU)

HYPERSONIC FLOW
Verification of computational aerodynamic predictions for complex hypersonic vehicles using the INCA™ code, 20:8258 (R;US)

I

IAEA
See also ICTP
The radioactive waste safety standards (RADWASS) programme. A series of international consensus documents on the safe management and disposal of radioactive waste, 20:7316 (I;XA)
Transportation and packaging resource guide, 20:7282 (R;US)
Waste management assessment and technical review programme. WATRP. An international peer review service for radioactive waste management activities, 20:7317 (I;XA)

IAEA SAFEGUARDS
Program of technical assistance to the organization for the prohibition of chemical weapons, informal report, 20:8419 (R;US)

IBM COMPUTERS
Users guide for the ANL IBM SP1, 20:9154 (R;US)

IBR-1
See IFR REACTOR

ICE
Recent findings with respect to climate development, 20:7850 (IA;CH)

ICTP
International Centre for Theoretical Physics, Trieste. Scientific activities in 1993, 20:9134 (R;XA)

IDAHO
Aggradational and erosional history of the Radioactive Waste Management Complex at the Idaho National Engineering Laboratory, 20:7311 (R;US)
Kokanee stock status and contribution of Cabinet Gorge Hatchery, Lake Pend Oreille, Idaho. Final report, 20:7575 (R;US)

IDAHO NATIONAL ENGINEERING LABORATORY
Air Emission Inventory for the Idaho National Engineering Laboratory, 1993 emissions report, 20:8434 (R;US)
Alternative futures for the Department of Energy National Laboratories, 20:7881 (R;US)

Hazards assessment for the Waste Experimental Reduction Facility, 20:7312 (R;US)

IEA
See INTERNATIONAL ENERGY AGENCY

IFR REACTOR
Process to remove rare earth from IFR electrolyte, 20:7278 (PA;US)

IGNITION (THERMONUCLEAR)
See THERMONUCLEAR IGNITION

ILLUMINATION SYSTEMS
See LIGHTING SYSTEMS

IMAGE PROCESSING
The use of a CCD imaging system for X-ray film intensity measurement, 20:8331 (R;AU)

IMIDES
Microporous polyimide films for reduced dielectric applications, 20:8148 (R;US)

IMPEDANCE
Impedance measurement of irradiated potatoes: a method to identify radiation processing., 20:8207 (IA;MX)

IN-CORE FUEL MANAGEMENT
See FUEL MANAGEMENT

IN-CORE THERMIONIC REACTOR
See ZERO POWER REACTORS

IN-SITU COMBUSTION
Field application of in situ combustion – past performance/future application: Proceedings, 20:7227 (R;US)

INCIDENTS
See ACCIDENTS

INCINERATION
See COMBUSTION

INCONEL 600
A study on the thermal and mechanical properties of inconel for steam generator U-tube, 20:7693 (R;KR;In Korean)

INCONEL 625
Robotic weld overlay coatings for erosion control. Quarterly technical progress report, July–September, 1994, 20:8078 (R;US)

INCONEL 690
A study on the thermal and mechanical properties of inconel for steam generator U-tube, 20:7693 (R;KR;In Korean)

INDIA
The role of plutonium in the nuclear power programme of India, 20:7269 (RA;XA)

INDICATORS
Tetraethyl orthosilicate-based glass composition and method, 20:8172 (PA;US)

INDIUM
Evaluated neutron data file for indium, 20:8889 (RA;CN)

INDIUM COMPOUNDS
The study of free electrons role on creation of magnetic phases in intermetallic compounds of Gd Al_2, Gd_2 In, and La_2 Al, 20:8088 (IA;IR;In English, Persian)

INDOOR AIR CONTAMINATION
Results of actions to reduce the amount of radon in the town of Jachymov. The nursery school building, 20:8494 (IA;CZ;In Czech)

INDUSTRIAL RADIOGRAPHY
See also NEUTRON RADIOGRAPHY
X-RAY RADIOGRAPHY
Industrial x-ray computed tomography, 20:8588 (RA;IL)

INDUSTRIAL SECTOR
See INDUSTRY

INDUSTRIAL WASTES
See also SPENT LIQUORS
Development of industrial waste heat recovery system using chemical heat pump with NH_3-salt(I), 20:7971 (R;KR;In Korean)
Full report: Assessment and opportunity identification of energy efficient pollution prevention technologies and processes, 20:8040 (R;US)
Prospects for pyrolysis technologies in managing municipal, industrial, and DOE cleanup wastes, 20:7542 (R;US)
Summary report: Assessment and opportunity identification of energy efficient pollution prevention technologies and processes, 20:8039 (R;US)

INDUSTRY
See also AEROSPACE INDUSTRY
CHEMICAL INDUSTRY
COAL INDUSTRY
ELECTRIC POWER INDUSTRY
NATURAL GAS INDUSTRY
PETROLEUM INDUSTRY
TEXTILE INDUSTRY
Energy research - as seen by industry, 20:7841 (IA;CH)
Industrial sector energy conservation programs in the People's Republic of China during the seventh five-year plan (1986–1990), 20:8027 (R;US)
Monthly energy review: January 1995, 20:7913 (R;US)
Technology transfer 1995, 20:7874 (R;US)

INELASTIC SCATTERING
See also RESONANCE SCATTERING
Inelastic plasmon and inter-band electron-scattering potentials for Si from dielectric matrix calculations, 20:9016 (R;AU)
Zone axis backscattered electron contrast for fast electrons, 20:9013 (R;AU)

INFORMATION
See also DATA
Buried Waste Integrated Demonstration commercialization actions plans. Volume 1, 20:9189 (R;US)

INFORMATION RETRIEVAL
Raising the IQ in full-text searching via intelligent querying, 20:9188 (R;US)

INFORMATION SYSTEMS
Development of technical information processing systems, 20:9192 (R;KR;In Korean)
Final report and recommendations of the ESnet Authentication Pilot Project, 20:9184 (R;US)
Information systems of the future: Rights and responsibilities, 20:9196 (R;US)
Integration of heterogeneous data bases for development of a large-scale environmental data atlas for multi-platform PC and workstation users, 20:7503 (R;US)
Liquid Effluent Monitoring Information System (LEMIS) test plans release 1.0, 20:7415 (R;US)
Positioning the electric utility to build information infrastructure, 20:7909 (R;US)
Search Hanford accessible reports electronically system configuration management plan, 20:7287 (R;US)

INFRARED SPECTROMETERS
FT-IR microscopical analysis with synchrotron radiation: The microscope optics and system performance, 20:8981 (R;US)

INJECTION FLUIDS
See DISPLACEMENT FLUIDS

INJECTION WELLS
Integrated approach towards the application of horizontal wells to improve waterflooding performance. Quarterly technical progress report, July 1–September 30, 1994, 20:7213 (R;US)

INORGANIC PHOSPHORS
See also CESIUM IODIDES
$LuAlO_3$: A high density, high speed scintillator for gamma detection, 20:8392 (R;US)

INPUT WELL
See INJECTION WELLS

INSOLATION
Standardization of direct and global solar radiation in Korea (II), 20:7966 (R;KR;In Korean)

INSTRUMENTS (MEASURING)
See MEASURING INSTRUMENTS

INSULATION (THERMAL)
See THERMAL INSULATION

INTEGRAL EQUATIONS
Extensions and results from a method for evaluating fractional integrals, 20:8708 (R;AU)

INTEGRATED CIRCUITS
Failure analysis: Status and future trends, 20:8222 (R;US)
High-performance GaAs/AlGaAs optical modulators: Their performance and packaging for microwave photonic integrated circuits, 20:8277 (R;US)

Micro heat spreader enhanced heat transfer in MCMs, 20:8279 (R;US)

INTEGRATORS (PULSE)
See PULSE INTEGRATORS

INTERFACES
A Monte-Carlo model of ionic transport across a solid interface, 20:8698 (R;XA)
A simple, closed-form expression for the x-ray reflectivity from superlattices with cumulative roughness, 20:8991 (R;US)
Layer-by-layer analysis of chemical composition at the interface of Fe-Pd structure irradiated with Xe^+ ions, 20:8093 (IA;RU;In Russian)

INTERFACES (EQUIPMENT)
See EQUIPMENT INTERFACES

INTERFEROMETRY
Interferometry with particles of non-zero rest mass: topological experiments, 20:8684 (R;AU)
Multi-particle correlations in quaternionic quantum systems, 20:8707 (R;AU)

INTERMEDIATE MASS NUCLEI
See also BARIUM 126
BARIUM 128
BARIUM 130
CADMIUM 104
CESIUM 133
CESIUM 137
COBALT 60
COBALT 61
COPPER 61
COPPER 63
GALLIUM 61
HAFNIUM 180
IODINE 125
IRON 61
MOLYBDENUM 100
NICKEL 61
STRONTIUM 90
STRONTIUM 91
TECHNETIUM 99
TIN 100
ZINC 61
Study on the photonuclear reactions with alpha particles and cluster emission in the region of giant dipole resonance, 20:8922 (IA;RU;In Russian)

INTERMETALLIC COMPOUNDS
Synthesis of Ni_3Al and NiAl intermetallics, 20:8075 (R;US)
$UCoNiGe_2$ nonmagnetic solid solution of the antiferromagnets UCo_2Ge_2 and UNi_2Ge_2, 20:8081 (RA;IL)

INTERNAL COMBUSTION ENGINES
See also DIESEL ENGINES
SPARK IGNITION ENGINES
Volatile organic compound control technology by means of membranes, 20:8448 (R;DE)

INTERNATIONAL AGREEMENTS
Fourth and Fifth Amendment issues raised by Chemical Weapons Convention inspections, 20:8066 (R;US)
Legal aspects of national implementation of the Chemical Weapons Convention, 20:8067 (R;US)

INTERNATIONAL ATOMIC ENERGY AGENCY
See IAEA

INTERNATIONAL ENERGY AGENCY
Summary of IEA neutron source working group activities, 20:7531 (IA;DE)

INTERSTELLAR MAGNETIC FIELDS
Important plasma problems in astrophysics, 20:8706 (R;US)

INTRUSION DETECTION SYSTEMS
An overview of technology, equipment and applications, 20:7511 (R;US)

INVERSE SCATTERING PROBLEM
Ambiguities in strong absorption S-functions and corresponding potentials for heavy ion collisions, 20:8942 (R;AU)

IODINE
Application of microtron braking gamma radiation to study heavy metal distribution in the process of coal burning, 20:8167 (IA;RU;In Russian)
The chemical behaviour of iodine-129 in the process of radwaste conditioning, 20:7319 (R;DE;In German)

IODINE 125
Radiation Monitor (RAM) I-125, 20:8351 (RA;IL)

IODINE IODIDES
See IODINE

ION BEAM TARGETS
Progress in ion beam power coupling and ion-driven hohlraums on PBFA II, 20:9126 (R;US)

ION BEAMS
See also DEUTERON BEAMS
Crystalline beams: Theory, experiments, and proposals, 20:8300 (R;US)

ION BLOCKING
See ION CHANNELING

ION CHANNELING
Green profile function technique at the description of ion implantation in the case of axis channeling, 20:9005 (IA;RU;In Russian)

ION EXCHANGE MATERIALS
See also ORGANIC ION EXCHANGERS
Removal of cesium from aluminum decladding wastes generated in irradiated target processing using a fixed-bed column of resorcinol-formaldehyde resin, 20:7334 (R;US)

ION EXCHANGE MEMBRANES
See ION EXCHANGE MATERIALS
MEMBRANES

ION IMPLANTATION
Computerized simulation of rare gas ion implantation in polymer materials, 20:9006 (IA;RU;In Russian)
Ion implantation and thermal stress resistance of ceramics, 20:8132 (R;AU)
Ion volumetric rechanneling in heated crystal under implantation, 20:9004 (IA;RU;In Russian)
Modification of silicon near surface layer under nitrogen ion implantation, 20:9003 (IA;RU;In Russian)
Study of Ta-Si and CoSi systems implanted by boron and antimony ions, 20:9002 (IA;RU;In Russian)

ION SOURCES
See also ELECTRON BEAM ION SOURCES
PENNING ION SOURCES
Highly Efficient Surface Ionisation Ion Source for Ultra-Trace Detection of Quantities of Radio Toxic Strontium Isotopes, 20:8324 (R;XJ;In Russian)

IONIZATION CALORIMETERS
See SHOWER COUNTERS

IONIZATION GAGES
The development of a positron ionization gauge, 20:8415 (R;US)

IONIZING RADIATIONS
See also COSMIC RADIATION
GAMMA RADIATION
X RADIATION
Balancing radiation benefits and risks: The needs of an informed public, 20:8629 (R;US)
Committee on Interagency Radiation Research and Policy Coordination 10th anniversary report, 20:8628 (R;US)
Human radiation experiments: The Department of Energy roadmap to the story and the records, 20:8611 (R;US)
Research priorities for occupational radiation protection, 20:8626 (R;US)

IRAN
Iran's petroleum policy: Current trends and the future outlook, 20:7237 (R;US)

IRELAND
Statutory Instruments No 144 of 1994. European Communities (Protection of outside workers from ionising radiation) Regulations, 1994, 20:7514 (R;IE)

IRIDIUM
Time dependent indentation testing at non-ambient temperatures utilizing the high temperature mechanical properties microprobe, 20:8076 (R;US)

IRIDIUM ALLOYS
A study of the electrochemical behavior in tungsten and caustic solutions and platinum/iridium in chloride solutions, informal report, 20:8072 (R;US)
IRON
Benchmark analysis of MCNP™ ENDF/B-VI iron, 20:8948 (R;US)
Epitaxial growth of bcc transition metal films and superlattices onto MgO (111), (011) and (001) substrates, 20:8071 (R;US)
Layer-by-layer analysis of chemical composition at the interface of Fe-Pd structure irradiated with Xe+ ions, 20:8093 (IA;RU;In Russian)
IRON 61
Nuclear data sheets update for A = 61, 20:8851 (RA;CN)
IRON ALLOYS
See also IRON BASE ALLOYS
Robotic weld overlay coatings for erosion control. Quarterly technical progress report, July–September, 1994, 20:8078 (R;US)
IRON BASE ALLOYS
See also STEELS
Changes ib structure and properties of amorphous metallic alloys under ion irradiation, 20:8090 (IA;RU;In Russian)
IRON COMPOUNDS
See also IRON OXIDES
New nanophase iron-based catalysts for hydrocracking applications, 20:7231 (R;US)
IRON OXIDES
Investigation of Fe_3O_4 Colloid Behaviour in a Magnetic Field by Polarized Neutron Transmission, 20:8987 (R;XJ)
IRRADIATION DEVICES
Design, fabrication and installation of irradiation facilities - Advanced nuclear material development-, 20:7773 (R;KR;In Korean)
Operation of the irradiation facilities, 20:7522 (R;KR;In Korean)
IRRADIATION RIGS
See IRRADIATION DEVICES
ISING MODEL
24-th Order high temperature expansion for the 3-d Ising model, 20:8712 (R;US)
ISLAMABAD REACTOR PAKISTAN
See PARR REACTOR
ISOBUTYL ALCOHOL
See 2-METHYLPROPANOL
ISOELECTRONIC ATOMS
Inner- and outer-shell excitation in lithium isoelectronic sequence, 20:8952 (R;XA)
ISOLATED LOCATIONS
See REMOTE AREAS
ISOMERS
Nuclear Medicine Program progress report for quarter ending September 30, 1994, 20:8218 (R;US)
ISOTOPE APPLICATIONS
Studies on radiation processing -Studies on application of radiation and radioisotopes-, 20:7523 (R;KR;In Korean)
ISOTOPE ENRICHMENT
See ISOTOPE SEPARATION
ISOTOPE SEPARATION
Development of atomic spectroscopy technology, 20:8169 (R;KR;In Korean)
ISOTOPE SEPARATION PLANTS
T Plant hazards assessment, 20:7495 (R;US)
ISOTOPIC SEPARATION
See ISOTOPE SEPARATION
ISRAEL
BANKET - communication network for radiation monitoring devices, 20:8357 (RA;IL)
ISRAEL ATOMIC ENERGY COMMISSION
See also NEGEV NUCLEAR RESEARCH CENTER
Research laboratories annual report 1993, 20:9133 (R;IL)
ITER TOKAMAK
Beryllium in the ITER blanket, 20:9092 (R;US)
Collaborations in fusion research, 20:9125 (R;US)
Design studies for ITER x-ray diagnostics, 20:9082 (R;US)
Modeling of tritium recovery from lithium ceramics, 20:8212 (R;US)
Radioactivity computation of steady-state and pulsed fusion reactors operation, 20:9095 (R;US)
Study and realization of a power circuit of a superconducting dipole generator of a magnetic field, 20:9097 (R;FR;In French)
ITR REACTOR
See ZERO POWER REACTORS

J

JAILS
See PUBLIC BUILDINGS
JAPAN
The necessity for and significance of nuclear fuel recycling in Japan, 20:7270 (RA;XA)
Transportation technology transitions and macroeconomic growth – Contemporary evidence, 20:8010 (R;US)
JET ENGINE FUELS
Advanced thermally stable jet fuels. Technical progress report, January 1994–March 1994, 20:7247 (R;US)
SOFC development for logistics fuel applications, 20:7937 (RA;US)
JET REACTORS
See JET TOKAMAK
JET TOKAMAK
Alfven eigenmodes active excitation experiments in JET, 20:9073 (RA;CH)
Papers presented at the 15. international conference on plasma physics and controlled nuclear fusion research, 20:9071 (R;CH)
JINR
JINR Rapid Communications. Collection 3, 20:8375 (R;XJ)
Report on activity of the Joint Institute for Nuclear Research, 20:9137 (R;RU;In Russian)
JOB TRAINING
See TRAINING
JOINT INSTITUTE FOR NUCLEAR RESEARCH
See JINR
JOINTS (ANATOMY)
See BONE JOINTS
JORUM EVENT
See NUCLEAR EXPLOSIONS
UNDERGROUND EXPLOSIONS
JOSEPHSON JUNCTIONS
A simple model for the dc flux transformer in layered superconductors with Josephson coupling, 20:9034 (R;XA)
Microstructure and composition of a SNS Josephson junction using $CaRuO_3$ as the metallic barrier, 20:9026 (R;US)

K

K SHELL
K-shell ionization under zone axis electron diffraction conditions, 20:9018 (R;AU)
K-25 PLANT
See ORGDP
KAERI
A study for developing training courses of the nuclear training center -with priority given to the training goals of KAERI-, 20:9139 (R;KR;In Korean)
Environmental radiation monitoring around the research reactors, 20:8618 (R;KR;In Korean)
The development of KAERI management information system (II) -The development of Time Sheet Management System-, 20:9144 (R;KR;In Korean)
The development of KAERI management information system -First year: The development of manpower information management system-, 20:9167 (R;KR;In Korean)
KAOLIN
Evaluation of the effectiveness of the sealed double-ringed infiltrometers and the effects of changes in atmospheric pressure on hydraulic conductivity, 20:7438 (R;US)

KAON-NUCLEON INTERACTIONS
The evaluation of specific types of integrals involving confluent hypergeometric functions, 20:8943 (R;AU)
KAPPA-725 RESONANCES
See MESONS
KAZAKHSTAN
A study of small explosions and earthquakes during 1961–1989 near the Semipalatinsk Test Site, Kazakhstan, 20:8429 (R;US)
KINEMATICS (PARTICLE)
See PARTICLE KINEMATICS
KLYSTRONS
Design study of longitudinal dynamics of the drive beam in 1 TeV relativistic klystron two-beam accelerator, 20:8303 (R;US)
Study of the Reflex-Klystron., 20:8317 (I;MX;In Spanish)
KMR REACTOR
Development of the nuclear fuel materials for research reactor - Development of the advanced nuclear materials-, 20:7772 (R;KR;In Korean)
Development of the radioisotope production facility for the KMRR -Studies on application of radiation and radioisotopes-, 20:7774 (R;KR;In Korean)
Environmental radiation monitoring around the research reactors, 20:8619 (R;KR;In Korean)
Site selection of meteorological tower and environmental impact assessment of the cooling tower, 20:7754 (R;KR;In Korean)
Study of materials properties by neutron beam applications - Development of the advanced nuclear materials-, 20:8391 (R;KR;In Korean)
KNOCK-ON ELECTRONS
See ELECTRONS
KNOWLEDGE BASE
Qualitative processing of uncertainty, conflicts and redundancy in knowledge bases, 20:7742 (RA;XA)
KOBAYASHI-MASKAWA MATRIX
Dynamical Analogy of Cabibbo-Kobayashi-Maskawa Matrices, 20:8732 (R;XJ)
KONDO EFFECT
Alloying effects of Kondo insulators, 20:8976 (R;XA)
KOREA (NORTH)
See NORTH KOREA
KOREA (SOUTH)
See REPUBLIC OF KOREA
KOREA ADVANCED ENERGY RESEARCH INSTITUTE
See KAERI
KOREAN TRIGA-MARK-3 REACTOR
See TRIGA-3-SEOUL REACTOR

L

LA REINA REACTOR
See RESEARCH REACTORS
LABORATORIES
Hanford analytical sample projections FY 1995–FY 2000. Revision 1, 20:7413 (R;US)
The Environmental and Molecular Sciences Laboratory project – Continuous evolution in leadership, 20:7487 (R;US)
LABORATORY SYSTEM
The forbidden angular region of secondary particle emission in the laboratory system, 20:8872 (RA;CN)
LAKES
Contribution of organic acids to the acidity of Finnish lakes, 20:8549 (R;FI)
Thermal bar dynamics. Spring thermo- and hydrodynamics in large temperate lakes, 20:8543 (R;SE)
LAND FILLS
See SANITARY LANDFILLS
LAND POLLUTION CONTROL
Cadmium in Salix. A study to show the capacity of Salix to remove cadmium from farmland, 20:8517 (R;SE;In Swedish)
LAND RECLAMATION
The Institute's view of the use of wastes for environmental remedial actions and land reclamation, 20:8493 (IA;CZ;In Czech)
LANDFILLS
See SANITARY LANDFILLS
LANGMUIR OSCILLATIONS
See PLASMA WAVES
LANL
Continuation application, progress report, year IV, June 8, 1993–June 7, 1994, 20:7845 (R;US)
Environmental analysis of Lower Pueblo/Lower Los Alamos Canyon, Los Alamos, New Mexico, 20:7477 (R;US)
LANTHANIDES
See RARE EARTHS
LANTHANUM ALLOYS
$LaNi_5$ in a copper matrix, 20:8084 (RA;IL)
LANTHANUM CHROMITES
See CHROMIUM OXIDES
LANTHANUM COMPOUNDS
Processing of $LaCrO_3$ for solid oxide fuel cell applications, 20:7929 (RA;US)
The study of free electrons role on creation of magnetic phases in intermetallic compounds of Gd Al_2, Gd_2 In, and La_2 Al, 20:8088 (IA;IR;In English, Persian)
LASER RADIATION
Intensity dependence of the third harmonic generation efficiency for high power far infrared radiation in n-silicon, 20:9075 (R;CH)
Measurement of the magnetically-induced QED birefringence of the vacuum and an improved search for laboratory axions: Technical report. Project definition study of the use of assets and facilities of the Superconducting Super Collider Laboratory, 20:8754 (R;US)
Reflection and diffraction of atomic de Broglie waves by evanescent laser waves. Bare-state method, 20:8957 (R;AU)
LASERS
See also FREE ELECTRON LASERS
X-RAY LASERS
Method and apparatus for measuring the intensity and phase of an ultrashort light pulse, 20:8271 (PA;US)
LASL
Alternative futures for the Department of Energy National Laboratories, 20:7881 (R;US)
LATIR EVENT
See NUCLEAR EXPLOSIONS
UNDERGROUND EXPLOSIONS
LATTICE FIELD THEORY
24-th Order high temperature expansion for the 3-d Ising model, 20:8712 (R;US)
A general non-perturbative estimate of the energy density of lattice Hamiltonians, 20:8742 (R;AU)
Chiral symmetry on the lattice, 20:8710 (R;US)
Electroweak interactions on the lattice, 20:8750 (R;AU)
Plaquette expansion proof and interpretation, 20:8741 (R;AU)
Update on B_K with Wilson fermions, 20:8711 (R;US)
LATTICES (CRYSTAL)
See CRYSTAL LATTICES
LATTICES (REACTOR)
See REACTOR LATTICES
LATVIA
Energy saving consultancy and training in Latvia. Final report for phases C1, D and E1 with an update for phases A and B, 20:7889 (R;DK)
LAWRENCE BERKELEY LABORATORY
Alternative futures for the Department of Energy National Laboratories, 20:7881 (R;US)
Medical and biohazardous waste generator's guide: Revision 1, 20:8591 (R;US)
Nuclear Science Division: 1993 Annual report, 20:8844 (R;US)
LAWRENCE LIVERMORE LABORATORY
Mixed Waste Management Facility Preliminary Safety Analysis Report. Chapters 1 to 20, 20:7363 (R;US)
LAWRENCE LIVERMORE NATIONAL LABORATORY
See also LAWRENCE LIVERMORE LABORATORY
Alternative futures for the Department of Energy National Laboratories, 20:7881 (R;US)

LAWS
See also RESOURCE RECOVERY ACTS
TOXIC SUBSTANCES CONTROL ACTS
Selected legal documents in the field of peaceful uses of nuclear energy in the Czech Republic, 20:7882 (I;CZ;In Czech)

LCFFC PROCESS
See COAL LIQUEFACTION

LEAD
An assessment of high-energy explosives and metal contamination in soil at TA-67 (12), L-Site, and TA-14, Q-Site, 20:8420 (R;US)
Development of ultrasensitive spectroscopic analysis technology -Development of atomic spectroscopy technology-, 20:8988 (R;KR;In Korean)
Experimental evaluation of mercury release from molten lead, 20:8638 (R;US)
Nuclear-spin-dependent parity-nonconserving effects in thallium, lead and bismuth atoms, 20:8953 (R;RU)
Phasing out lead and mercury, 20:7861 (R;SE)

LEAD 204
Study on the (γ, γ') reactions with population of high spin ^{180m}Hf, ^{190m}Os and ^{204m}Pb isomers, 20:8920 (IA;RU;In Russian)

LEAD 206 TARGET
Spontaneous Fission of Light Californium Isotopes Produced in the ^{206,207,208} Pb + ^{34,36} S Reactions; New Nuclide ^{238} Cf, 20:8931 (R;XJ)

LEAD 207
Nuclear anapole moments in single-particle approximation, 20:8848 (R;RU)

LEAD 207 TARGET
Spontaneous Fission of Light Californium Isotopes Produced in the ^{206,207,208} Pb + ^{34,36} S Reactions; New Nuclide ^{238} Cf, 20:8931 (R;XJ)

LEAD 208
The (γ, γ')-experiment at the injection for the Moscow racetrack microtron, 20:8921 (IA;RU)

LEAD 208 TARGET
Ambiguities in strong absorption S-functions and corresponding potentials for heavy ion collisions, 20:8942 (R;AU)
Spontaneous Fission of Light Californium Isotopes Produced in the ^{206,207,208} Pb + ^{34,36} S Reactions; New Nuclide ^{238} Cf, 20:8931 (R;XJ)
Studies of the spin-isospin response of the nuclear continuum using intermediate energy hadrons. Final technical report, May 20, 1987–April 30, 1994, 20:8907 (R;US)

LEAD MINERALS
See MINERALS

LEAD OXIDES
Cooling rate effects on the microstructure, critical current density, and $T_c$transition of one- and two-powder BSCCO-2223 Ag-sheathed tapes, 20:8115 (R;US)

LEAD ZIRCONITE TITANATE
See PZT

LEAKAGE
See LEAKS

LEAKS
Subsurface barrier verification technologies, informal report, 20:7290 (R;US)

LEAST SQUARE FIT
A note on the total least squares problem for coplanar points, 20:9182 (R;US)
Several examples of least squares combination for derived data, 20:9159 (RA;CN)

LEED
See ELECTRON DIFFRACTION

LEPTONS
See also ELECTRONS
MUONS
Phenomenology of the two Higgs doublet sector of a quark-lepton symmetric model, 20:8775 (R;AU)
Possible reason why leptons are lighter than quarks, 20:8842 (R;AU)

LEVEL INDICATORS
Development of Liquid Level and Density Bubbler for DWPF Canyon Vessels. Final report, 20:7439 (R;US)
Wind and seismic analysis for liquid-level gauge support, 20:7395 (R;US)

LI-DRIFTED GE DETECTORS
The Calculation of the Main Characteristics of Ge(Li)-NaI(Tl) Anti-Compton Spectrometer by Monte Carlo Method, 20:8384 (R;XJ;In Russian)

LI-DRIFTED SI DETECTORS
Efficiency curve determination of Si (Li) detector., 20:8372 (IA;MX)

LICHTENBERG PROCESS
See COAL GASIFICATION

LIGANDS
Nuclear Medicine Program progress report for quarter ending September 30, 1994, 20:8218 (R;US)

LIGHT GUIDES
See OPTICAL FIBERS

LIGHT NUCLEI
See also ALUMINIUM 26
ALUMINIUM 27
BERYLLIUM 10
BERYLLIUM 8
CARBON 13
DEUTERIUM
LITHIUM 7
MAGNESIUM 24
PHOSPHORUS 31
TRITIUM
The (γ, γ')-experiment at the injection for the Moscow racetrack microtron, 20:8921 (IA;RU)
Twenty five years of clusters – from Bochum to Strasbourg, 20:8845 (R;US)

LIGHT SOURCES
Undulators for short wavelength FEL amplifiers, 20:8270 (R;US)

LIGHT WATER COOLED REACTORS
See WATER COOLED REACTORS

LIGHT WATER MODERATED REACTORS
See WATER MODERATED REACTORS

LIGHTING SYSTEMS
Blazing the energy trail: The Municipal Energy Management Program, 20:8044 (R;US)
Evaluation of advanced technologies for residential appliances and residential and commercial lighting, 20:7982 (R;US)
The design and evaluation of integrated envelope and lighting control strategies for commercial buildings, 20:7981 (R;US)

LIGHTNING
Evaluation of the damages caused by lightning current flowing through bearings, 20:7625 (RA;DK)

LIGHTNING ARRESTERS
A methodology for the evaluation of lightning protection measures for wind turbine generating stations, 20:7626 (RA;DK)

LIGNITE
Bench-scale development of coal/oil co-processing technology. Twelfth quarterly report, 1 July–30 September 1990, 20:7110 (R;US)
Molecular accessibility in oxidized and dried coals. Quarterly report, 20:7147 (R;US)

LIMESTONE
An experimental and theoretical study to relate uncommon rock/fluid properties to oil recovery. Quarterly report, October 1, 1993–December 31, 1993, 20:7190 (R;US)

LIMING
Beech (Fagus sylvatica) seedling growth and nutrition - effects of acid soils and liming, 20:8643 (R;SE)

LINACS
See LINEAR ACCELERATORS

LINEAR ACCELERATORS
See also CEBAF ACCELERATOR
LINEAR COLLIDERS
Elise - the next step in development of induction heavy ion drivers for inertial fusion energy, 20:9123 (R;US)
Funneling in LANL high intensity linac designs, 20:7325 (R;US)

Possible use of the AGS linac for proton therapy, 20:8283 (R;US)
Self-consistent beam halo studies & halo diagnostic development in a continuous linear focusing channel, 20:8301 (R;US)
Tutorial on beam-based feedback systems for linacs, 20:8308 (R;US)

LINEAR COLLIDERS
Exotic colliders, 20:8295 (R;US)
Linear collider research and development, 20:8297 (R;US)

LINERS
Hanford Permanent Isolation Barrier Program: Asphalt technology data and status report - FY 1994, 20:7341 (R;US)

LIOUVILLE EQUATION
See BOLTZMANN-VLASOV EQUATION

LIQUID ASPHALT
See PETROLEUM RESIDUES

LIQUID CONTAMINATION MONITORS
Housing for on-line radioactive contamination detection unit, 20:8358 (RA;IL)

LIQUID CRYSTALS
Hamiltonian dynamics of the condensed media with spontaneously broken symmetry, 20:9023 (R;XA)

LIQUID EFFLUENTS
See LIQUID WASTES

LIQUID METAL COOLED REACTORS
Liquid metal reactor development, 20:7677 (R;KR;In Korean)

LIQUID METAL FUELS
Development of metallic fuel materials -Development of the advanced nuclear materials-, 20:8100 (R;KR;In Korean)

LIQUID METAL TEST FACILITIES
See TEST FACILITIES

LIQUID METAL-WATER REACTIONS
See MOLTEN METAL-WATER REACTIONS

LIQUID PHASE METHANATION PROCESS
See COAL GASIFICATION

LIQUID WASTES
See also SPENT LIQUORS
WASTE WATER
Liquid Effluent Monitoring Information System (LEMIS) test plans release 1.0, 20:7415 (R;US)
Quality Assurance Project Plan for Facility Effluent Monitoring Plan activities, 20:8518 (R;US)

LITHIUM
Integral and differential cross sections foe the Li+HF->LiF+H process. A comparison between j_Z quantum mechanical and experimental results, 20:8185 (RA;IL)
Investigation of wetting phenomena and oxidation/lithiation behavior of nickel in molten carbonate, 20:7935 (RA;US)

LITHIUM 7
Evaluation of neutron nuclear data for ^{7}Li, 20:8903 (RA;CN)

LITHIUM ALLOYS
Hydrogen content determination in alkali metals, 20:8168 (IA;RU;In Russian)

LITHIUM COMPOUNDS
See also LITHIUM OXIDES
LITHIUM SILICATES
Recent advances in lithium ion technology, 20:7833 (R;US)
Transient radiation-induced absorption in materials for the DOI laser, 20:8278 (R;US)

LITHIUM OXIDES
In situ tritium from Li_2O and Li_2ZrO_3 irradiated in a fast neutron flux: BEATRIX-II, Phase 1 and 2, 20:9124 (R;US)
Modeling of tritium recovery from lithium ceramics, 20:8212 (R;US)
Validation of tritium transport models for Li_2O, 20:9090 (R;US)

LITHIUM SILICATES
Study on the interaction of lithium orthosilicate with water vapor and hydrogen, 20:9122 (R;DE;In German)

LITHUANIA
District heating strategy plan for Lithuania. Report C. General proposals for rehabilitation projects, 20:8048 (R;DK)
Rehabilitation of two gas pipes crossing the river Nemunas in Kaunas, Lithuania. Final report, 20:7255 (R;DK)

LNG PLANTS
Dynamic simulation of the liquefaction section in baseload LNG plants, 20:8254 (R;NO)

LOCA
See LOSS OF COOLANT

LOCAL GROUP
See GALAXIES

LOGIC (MATHEMATICS)
See MATHEMATICAL LOGIC

LOS ALAMOS NATIONAL LABORATORY
See LANL

LOS ALAMOS SCIENTIFIC LABORATORY
See LASL

LOSS OF COOLANT
Application of neural networks in nuclear safety analysis, 20:7641 (RA;XA)
Experimental results of the CORA test program on the LWR fuel element behavior in severe reactor accidents, 20:7812 (RA;DE;In German)
Post-test examination and evaluation of the CORA experiments. Contribution to the evaluation of the CORA-W1 test bundle, 20:7813 (RA;DE;In German)
The development of LOCA analysis codes for nuclear power plant, 20:7664 (R;KR;In Korean)

LOW ALLOY STEELS
High intensity ion implantation: method of nitride phase formation, 20:8089 (IA;RU;In Russian)

LOW DOSE IRRADIATION
Hematopoietic tissue repair under chronic low daily dose irradiation, 20:8607 (R;US)

LOW ENERGY ELECTRON DIFFRACTION
See ELECTRON DIFFRACTION

LOW INCOME GROUPS
Continuation application, progress report, year IV, June 8, 1993–June 7, 1994, 20:7845 (R;US)
Household energy and nutrition. A study of low-income households in Lusaka, 20:8009 (R;SE)

LOW-LEVEL RADIOACTIVE WASTES
Detoxification
Tank waste processing analysis: Database development, tank-by-tank processing requirements, and examples of pretreatment sequences and schedules as applied to Hanford Double-Shell Tank Supernatant Waste - FY 1993, 20:7338 (R;US)

Ground Disposal
FY 1995 Remedial Investigation Work Plan for Waste Area Grouping 2 at Oak Ridge National Laboratory, Oak Ridge, Tennessee, 20:7298 (R;US)

Materials Handling
Design assessment for Melton Valley liquid low-level waste collection and transfer system upgrade project at Oak Ridge National Laboratory, Oak Ridge, Tennessee, 20:7297 (R;US)

Radioactive Waste Disposal
Area 5 Site characterization project report, FY 1994, 20:7443 (R;US)

Radioactive Waste Processing
Operating cost guidelines for benchmarking DOE thermal treatment systems for low-level mixed waste, 20:7336 (R;US)
Removal of cesium from aluminum decladding wastes generated in irradiated target processing using a fixed-bed column of resorcinol-formaldehyde resin, 20:7334 (R;US)
Vitrification Studies with DOE Low-Level Mixed Waste Wastewater Treatment Sludges, 20:7429 (R;US)

Radioactive Waste Storage
Design demonstrations for category B tank systems at Oak Ridge National Laboratory, Oak Ridge, Tennessee, 20:7300 (R;US)
Design/installation and structural integrity assessment under the Federal Facility Agreement for Bethel Valley low-level waste collection and transfer system upgrade for Building 2026 (High Radiation Level Analytical Laboratory) and Building 2099 (Monitoring and Control Station) at Oak Ridge National Laboratory, 20:7299 (R;US)

Selection of liquid-level monitoring method for the Oak Ridge National Laboratory inactive liquid low-level waste tanks, remedial investigation/feasibility study, 20:7333 (R;US)

Recycling
The stainless steel beneficial reuse integrated demonstration, 20:7428 (R;US)

Remedial Action
FY94 Office of Technology Development Mixed Waste Operations Robotics Demonstration, 20:7504 (R;US)

Separation Processes
Chemistry of proposed calcination/dissolution processing of Hanford Site tank wastes, 20:7369 (R;US)

Transport
Design assessment for Melton Valley liquid low-level waste collection and transfer system upgrade project at Oak Ridge National Laboratory, Oak Ridge, Tennessee, 20:7297 (R;US)

Underground Disposal
Fire hazard analysis for the Westinghouse Hanford Company managed low-level mixed waste Trench 31 and 34, 20:7502 (R;US)

Underground Storage
Tank waste processing analysis: Database development, tank-by-tank processing requirements, and examples of pretreatment sequences and schedules as applied to Hanford Double-Shell Tank Supernatant Waste - FY 1993, 20:7338 (R;US)

Vitrification
Evaluation of plasma melter technology for verification of high-sodium content low-level radioactive liquid wastes: Demonstration test No. 4 preliminary test report, 20:7422 (R;US)
Low-Level Waste Vitrification Plant Project contracting strategy decision analysis report, 20:7390 (R;US)
Tank Waste Remediation System tank waste pretreatment and vitrification process development testing requirements assessment, 20:7411 (R;US)
Vitrification of high sulfate wastes, 20:7350 (R;US)

LOWER HYBRID CURRENT DRIVE
Study of the dynamics of the lower hybrid wave during current drive in tokamaks and of the Weyl-Wigner in quantum mechanics, 20:9047 (R;FR;In French)

LUMMUS CLEAN FUEL FIRM COAL PROCESS
See COAL LIQUEFACTION

LUNG CELLS
See RESPIRATORY TRACT CELLS

LUNGS
Early operating experience with large-area germanium detectors for detecting low-energy photons, 20:8633 (R;US)

LWGR TYPE REACTORS
See also CHERNOBYLSK-4 REACTOR
SPDS development for an RBMK unit, 20:7727 (RA;XA)
The SPDS as a tool to improve post-accident strategy on WWER and RBMK reactors, 20:7719 (RA;XA)
The design concept of an on-line diagnosis system of a sophisticated technological object: The shell of expert diagnosis system "Dasha", 20:7722 (RA;XA)
The safety of WWER and RBMK nuclear power plants. Progress report on the IAEA extrabudgetary programme on the safety of WWER and RBMK nuclear power plants, 1992-1994, 20:7653 (R;XA)

LWR TYPE REACTORS
See WATER COOLED REACTORS

LYMPHOCYTES
Statistical methods for the analysis of a screening test for chronic beryllium disease, 20:8644 (R;US)

LYMPHOID CELLS
See LYMPHOCYTES

M

MA 754
See NICKEL BASE ALLOYS

MA 956
See IRON BASE ALLOYS

MAGNESIUM 24
Experimental searches for exotic alpha-cluster configurations, 20:8846 (R;US)

MAGNESIUM 24 TARGET
Pion Momentum Spectra in Nuclear Charge Exchange Reactions A(t, ^{3} He), 20:8928 (R;XJ)

MAGNESIUM CARBIDES
Conversion of light hydrocarbon gases to metal carbides for production of liquid fuels and chemicals. Quarterly technical status report, July 1–September 30, 1994, 20:7248 (R;US)

MAGNESIUM FLUORIDES
Thermodynamic modeling of hydrogen fluoride production relevant to actinide residue treatment, 20:7263 (R;US)

MAGNESIUM OXIDES
Conversion of light hydrocarbon gases to metal carbides for production of liquid fuels and chemicals. Quarterly technical status report, July 1–September 30, 1994, 20:7248 (R;US)
Epitaxial growth of bcc transition metal films and superlattices onto MgO (111), (011) and (001) substrates, 20:8071 (R;US)

MAGNETIC ENERGY STORAGE EQUIPMENT
Design of a high-temperature superconductor current lead for electric utility SMES, 20:7826 (R;US)

MAGNETIC FIELDS
See also INTERSTELLAR MAGNETIC FIELDS
Parallel computation of automatic differentiation applied to magnetic field calculations, 20:8302 (R;US)

MAGNETIC MIRROR CONFIGURATIONS
Longitudinal losses of charged particles from an open configuration with arbitrary β ratio, 20:9058 (R;RU;In Russian)
Optimization of an expander of a gas-dynamic trap, 20:9065 (R;RU;In Russian)
Removal of impurity ions from a magnetic trap with a two-component plasma on their collision with fast component ions, 20:9055 (R;RU;In Russian)

MAGNETIC SPECTROMETERS
Equipment for Measurement ICE and eγ-Coincidence Spectra, 20:8383 (R;XJ;In Russian)

MAGNETISM
See also FERROMAGNETISM
New Fermi-liquid approach for the theory of disordered magnetics, 20:8699 (R;XA)

MAGNETOHYDRODYNAMIC GENERATORS
See MHD GENERATORS

MAIZE
The application of irradiation techniques for food preservation and process improvement -Studies on application of radiation and radioisotopes-, 20:8605 (R;KR;In Korean)

MALI
Comment on the isotopic measures of Niger in Banankoro and of Bani in the Douna-San region, 20:8535 (RA;XA;In French)

MALIGNANCIES
See NEOPLASMS

MAN
See also PERSONNEL
Cellular morphometry and cycling cell populations of human and dog bronchi. Annual progress report, April 1, 1994–March 31, 1995, 20:8612 (R;US)
ELSI Bibliography: Ethical, legal and social implications of the Human Genome Project. 1994 Supplement, 20:8578 (R;US)
Human radiation experiments: The Department of Energy roadmap to the story and the records, 20:8611 (R;US)

MAN-MACHINE SYSTEMS
Computer software review procedures, 20:7738 (RA;XA)
Enhancement of verification and validation for nuclear reactors through artificial intelligence, 20:7736 (RA;XA)
IAEA co-ordinated research programme on operator support systems in nuclear power plants, 20:9197 (RA;XA)
Man-machine systems in the nuclear power industry, 20:7735 (RA;XA)
Operator support systems in nuclear power plants. Proceedings of a specialists meeting held in Moscow, Russian Federation, 17-21 May 1993, 20:7709 (R;XA)

Rex: A methodology used for the structured processing of nuclear power plant operation experience feedback, principles and extension to case based reasoning, 20:7746 (RA;XA)

MANGANESE
The evaluation of Mn data for 10^{-5} eV to 20 MeV neutrons, 20:8886 (RA;CN)

MANGANESE OXIDES
Heterogeneous catalytic process for alcohol fuels from syngas. Ninth quarterly technical progress report, January 1994–March 1994, 20:7565 (R;US)
Hot coal gas desulfurization with manganese-based sorbents. Final report, September 1992–December 1994, 20:7104 (R;US)

MANIPULATORS
A redundant, 6-DOF parallel manipulator structure with improved workspace and dexterity, 20:8244 (R;US)
Lightweight extendable and retractable pole, 20:8243 (PA;US)
Parametric design using IGRIP, 20:7353 (R;US)

MANUALS
CALSON Process, 20:9195 (R;US)

MANUFACTURED BUILDINGS
See PREFABRICATED BUILDINGS

MANUFACTURING
Prosperity Game: Advanced Manufacturing Day, May 17, 1994, 20:7847 (R;US)

MANURES
Methane recovery from animal manures: A current opportunities casebook, 20:7552 (R;US)

MANY-BODY PROBLEM
Removal of the Energy Dependence from the Resolvent Like Energy Dependent Interactions, 20:8680 (R;XJ)
Study of the generalized solutions of n-body type problems with weak forces, 20:8676 (R;XA)

MAPPING (TOPOLOGICAL)
See TOPOLOGICAL MAPPING

MARINE DISPOSAL
Environmental impacts of ocean disposal of CO_2. First quarterly report, September 1–September 30, 1994, 20:7856 (R;US)

MARINE ECOSYSTEMS
See AQUATIC ECOSYSTEMS

MARINE VEHICLE ACCIDENTS
See ACCIDENTS

MARTENSITIC STEELS
See also STEEL-CR12MOV
Metallurgical and mechanical tests on the low activating martensitic chromium steel OPTIFER-IV, 20:8102 (R;DE;In German)

MARVEL EVENT
See NUCLEAR EXPLOSIONS
UNDERGROUND EXPLOSIONS

MASS DIFFERENCE
Electromagnetic Hadron Mass Differences and Estimation of Isotopic Symmetry Violation Parameters of QCD Vacuum from Quark Model, 20:8763 (R;XJ)

MASSIVE VECTOR-MESON MODEL
See GLUON MODEL

MATERIALS
See also BIOLOGICAL MATERIALS
COMPOSITE MATERIALS
ENVIRONMENTAL MATERIALS
GRANULAR MATERIALS
HAZARDOUS MATERIALS
ION EXCHANGE MATERIALS
PHASE CHANGE MATERIALS
RADIOACTIVE MATERIALS
RAW MATERIALS
REACTOR MATERIALS
SEALING MATERIALS
SEMICONDUCTOR MATERIALS
THERMONUCLEAR REACTOR MATERIALS
Microstructural behavior of nonequilibrium systems. Final report, March 1, 1986–May 31, 1993, 20:8069 (R;US)
Understanding and improving materials processing through interpreting and manipulating predictive models, 20:8108 (R;US)

MATERIALS (ANTIFERROMAGNETIC)
See ANTIFERROMAGNETIC MATERIALS

MATERIALS (BIOLOGICAL)
See BIOLOGICAL MATERIALS

MATERIALS (COMPOSITE)
See COMPOSITE MATERIALS

MATERIALS (ENVIRONMENTAL)
See ENVIRONMENTAL MATERIALS

MATERIALS (SEMICONDUCTOR)
See SEMICONDUCTOR MATERIALS

MATERIALS HANDLING EQUIPMENT
See also CRANES
REMOTE HANDLING EQUIPMENT
Light Duty Utility Arm interface control document plan, 20:7380 (R;US)
Melter feed tank operating map from the FA-10.02 test data, 20:7434 (R;US)
New novel cleaning technique for extending mean time between mechanical cleans in a Genus tungsten CVD reactor, 20:8106 (R;US)
Operability test procedure [Tank] 241-SY-101 equipment removal system, 20:7405 (R;US)

MATERIALS RECOVERY
Volatile organic compound control technology by means of membranes, 20:8448 (R;DE)

MATHEMATICAL LOGIC
See also FUZZY LOGIC
Preservation theorems on finite structures, 20:8693 (R;XA)

MATHEMATICAL MANIFOLDS
Around Ratner, 20:8672 (R;XA)
Generalized Kummer surfaces and differentiable invariants of Noether-Horikawa surfaces 1, 20:8677 (R;XA)

MATHEMATICAL SPACE
The Conical Singularity and Quantum Corrections to Entropy of Black Hole, 20:8657 (R;XJ)

MATRICES
See also HERMITIAN MATRIX
KOBAYASHI-MASKAWA MATRIX
R MATRIX
Bounds for departure from normality and the Frobenius norm of matrix eigenvalues, 20:9183 (R;US)

MAXIMUM CREDIBLE ACCIDENT
A severe accident simulator for the Paks Nuclear Power Plant, 20:7734 (RA;XA)
SAMSON: Severe accident management system on-line network, 20:7743 (RA;XA)

MCA
See MAXIMUM CREDIBLE ACCIDENT

MCDOWELL-WELLMAN PROCESS
See COAL GASIFICATION

MEASURED VALUES
See DATA

MEASURING INSTRUMENTS
See also CALORIMETERS
DOSEMETERS
LEVEL INDICATORS
MOISTURE GAGES
PENETROMETERS
RADIATION DETECTORS
THERMOCOUPLES
VELOCIMETERS
Inspection system performance test procedure, 20:7393 (R;US)
Tank SY-101 void fraction instrument functional design criteria, 20:7403 (R;US)

MEAT
The lethal effect of gamma irradiation on the meta cestode of Taenia solium in pork., 20:8613 (IA;MX)

MEAT INDUSTRY
Methane recovery from animal manures: A current opportunities casebook, 20:7552 (R;US)

MECHANICAL STRUCTURES
See also SUPPORTS
Support girder design for the atlas hadron calorimeter, 20:8341 (R;US)

MEDICAL SUPPLIES
Medical and biohazardous waste generator's guide: Revision 1, 20:8591 (R;US)
MEDICINAL PLANTS
Studies on safety and efficacy of gamma-irradiated ginseng -Development of irradiation techniques for quality improvement of ginseng products, 20:8604 (R;KR;In Korean)
MELTDOWN
Drill core investigations from the TMI-2 pressure vessel. Final report, 20:7787 (R;DE;In German, English)
Investigation of in-vessel accident sequences, 20:7815 (RA;DE;In German)
Load capacity analysis of RPV failure, 20:7805 (RA;DE;In German)
Mechanical loads on the RPV, 20:7801 (RA;DE)
Molten core cooling systems for future PWR plants, 20:7797 (RA;DE;In German)
Premix experiments, 20:7800 (RA;DE;In German)
Safety requirements on future LWR plants, 20:7789 (RA;DE;In German)
Steam explosion, premixing experiments with solid spheres, 20:7802 (RA;DE;In German)
Studies of distribution and combustion of hydrogen in PWR type plants, 20:7794 (RA;DE;In German)
Studies of hydrogen distribution and combustion in PWR plants, 20:7799 (RA;DE;In German)
The FPT O experiment of the Phebus project, 20:7814 (RA;DE;In German)
Theoretical analyses of interactions between core melt and coolant, 20:7803 (RA;DE;In German)
MEMBRANES
See also CELL MEMBRANES
Membrane contactors to replace conventional scrubbers, 20:7638 (R;DK)
Polymer membranes for methane gas treatment, 20:7546 (R;DE;In German)
MEMORY DEVICES
CD-ROM in the age of internet, 20:9160 (R;US)
MERC PROCESS
See COAL GASIFICATION
MERCURY
An assessment of high-energy explosives and metal contamination in soil at TA-67 (12), L-Site, and TA-14, Q-Site, 20:8420 (R;US)
Development of atomic spectroscopy technology, 20:8169 (R;KR;In Korean)
Experimental evaluation of mercury release from molten lead, 20:8638 (R;US)
Phasing out lead and mercury, 20:7861 (R;SE)
MERCURY OXIDES
Device-quality tunnel junctions on the high $T_c$superconductor $HgBa_2CuO_{4+\delta}$, 20:8117 (R;US)
MESON RESONANCES
See MESONS
MESONS
See also BOTTOMONIUM
PSEUDOSCALAR MESONS
SCALAR MESONS
TOPONIUM
Universality of $\Delta I = 1$ meson mixing and charge symmetry breaking, 20:8867 (R;AU)
METAGALAXY
See UNIVERSE
METAL BUILDINGS
See PREFABRICATED BUILDINGS
METAL-METAL OXIDE BATTERIES
Recent advances in lithium ion technology, 20:7833 (R;US)
METAL-NONMETAL BATTERIES
Thermal modeling of the lithium/polymer battery, 20:7831 (R;US)
METAL-WATER REACTIONS
See MOLTEN METAL-WATER REACTIONS
METALS
See also ACTINIDES
ALKALI METALS
ALUMINIUM
ANTIMONY
BISMUTH
CADMIUM
INDIUM
LEAD
MERCURY
RARE EARTHS
SCRAP METALS
THALLIUM
TRANSITION ELEMENTS
ZINC
F-Area Acid/Caustic Basin groundwater monitoring report: Third quarter 1994, 20:8520 (R;US)
Magnetic Survey of the Hydroflouric Acid Spill Area, 20:7464 (R;US)
Metallurgical Laboratory Hazardous Waste Management Facility groundwater monitoring report. Third quarter, 1994, 20:7463 (R;US)
Rejuvenation and recovery of electroplating acids using the WADR technology, 20:8038 (R;US)
METEOROLOGY
Report of the international workshop on quality control of monthly climate data, 20:9194 (R;US)
METHANE
A simulated countercurrent moving-bed chromatographic reactor for the oxidative coupling of methane: Experimental results, 20:7571 (R;US)
Conversion of light hydrocarbon gases to metal carbides for production of liquid fuels and chemicals. Quarterly technical status report, July 1–September 30, 1994, 20:7248 (R;US)
Generation, detection and characterization of gas-phase transition metal aggregates and compounds. Final technical report, September 15, 1991–July 14, 1994, 20:8181 (R;US)
Methane recovery from animal manures: A current opportunities casebook, 20:7552 (R;US)
Polymer membranes for methane gas treatment, 20:7546 (R;DE;In German)
Rate inhibition of steam gasification by adsorbed hydrogen. Quarterly technical progress report, July 1–September 30, 1994, 20:7568 (R;US)
METHANOL
Development of a catalyst for conversion of syngas-derived materials to isobutylene. Quarterly report number 11, October 1–December 31, 1993, 20:7563 (R;US)
Heterogeneous catalytic process for alcohol fuels from syngas. Ninth quarterly technical progress report, January 1994–March 1994, 20:7565 (R;US)
Heterogeneous catalytic process for alcohol fuels from syngas. Tenth quarterly technical progress report, April 1994–June 1994, 20:7566 (R;US)
Macrocyclic redox promoters for direct methanol fuel cells, 20:7932 (RA;US)
Study on the production of alternative fuels by carbon dioxide hydrogenation (I), 20:7569 (R;KR;In Korean)
METHYL ALCOHOL
See METHANOL
METHYL-FUEL
See METHANOL
METHYLBENZENE
See TOLUENE
METRICS
Ricci-flat Kaehler metrics on symmetric varieties, 20:8718 (R;XA)
METROPOLITAN AREAS
See URBAN AREAS
MEXICO
Analysis of Pre colombian Mexican golden pieces by X-ray fluorescence spectrometry., 20:8161 (IA;MX)
MHD GENERATOR ETL MARK V
See MHD GENERATORS
MHD GENERATORS
Method of and system for producing electrical power, 20:7259 (PA;US)

MICELLAR SYSTEMS
Small angle X-ray scattering studies of aggregation in supercritical fluid solutions, 20:8191 (R;US)

MICELLAR-POLYMER FLOODING
See MICROEMULSION FLOODING

MICHIGAN
Recovery of bypassed oil in the Dundee Formation using horizontal drains. Quarterly report, 4th quarter, FY 1994, 20:7222 (R;US)

MICROBIAL ENHANCED OIL RECOVERY
See MICROBIAL EOR

MICROBIAL EOR
Polysaccharides and bacterial plugging. Final report, 1992–1993, 20:7200 (R;US)
Quantitation of microbial products and their effectiveness in enhanced oil recovery. Final report, 20:7199 (R;US)

MICROELECTRONIC CIRCUITS
See also INTEGRATED CIRCUITS
New novel cleaning technique for extending mean time between mechanical cleans in a Genus tungsten CVD reactor, 20:8106 (R;US)

MICROEMULSION FLOODING
Detailed evaluation of the West Kiehl alkaline-surfactant-polymer field project and it's application to mature Minnelusa waterfloods. Technical progress report, July–September, 1994, 20:7203 (R;US)

MICROSTRUCTURE
See also GRAIN SIZE
Characterization of MMA/LDPE copolymer films obtained by gamma radiation., 20:8206 (IA;MX)
The effects of H^+ implants on $YBa_2Cu_3O_7$ superconducting materials, 20:9028 (R;CN;In Chinese)

MICROTRONS
Microtron MT-25 and its areas of use, 20:8291 (IA;RU)
Microtron MT-25. (Electromagmet design, operating experience), 20:8290 (IA;RU;In Russian)
Microtron as an injector into an electron synchrotron, 20:8319 (IA;RU)
On a possibility of application of the MT-25 microtron in the Plovdiv University, 20:8917 (IA;RU;In Russian)
Present status on organization of nuclear-physical laboratory 'MICROTRON' in Plovdiv University, 20:8289 (IA;RU;In Russian)
Project of a laboratory for activation analysis on the basis of microtron MPR, 20:8292 (IA;RU;In Russian)
The 17-orbit microtron from the Institute of Atomic Physics, Bucharest, 20:8320 (IA;RU)

MID-ATLANTIC REGION
See USA

MIDDLE GUST EVENT
See CHEMICAL EXPLOSIONS

MIDWEST REGION
See USA

MIGAS PROCESS
See COAL GASIFICATION

MIGHTY EPIC EVENT
See NUCLEAR EXPLOSIONS
UNDERGROUND EXPLOSIONS

MIGRATION (RADIONUCLIDE)
See RADIONUCLIDE MIGRATION

MILK
Measuring program of the Federal Republic of Germany. Results of environmental measurement in Russia, Byelorussia and Ukraine in the time from May 17 to September 2, 1993, and from October 8 to November 1, 1993, 20:8496 (R;DE;In German)

MILROW EVENT
See NUCLEAR EXPLOSIONS
UNDERGROUND EXPLOSIONS

MINE-MOUTH GENERATING PLANTS
See FOSSIL-FUEL POWER PLANTS

MINERAL WASTES
Removal of pyrite and trace elements from waste coal by dissolved-CO_2 flotation and chelating agents. Final technical report, September 1, 1993–August 31, 1994, 20:7098 (R;US)

MINERALS
Investigation of mineral transformations and ash deposition during staged combustion. Quarterly technical progress report, July 1–September 30, 1994, 20:7178 (R;US)

MINIATA EVENT
See NUCLEAR EXPLOSIONS
UNDERGROUND EXPLOSIONS

MINING EQUIPMENT
Automation in mining - sensor for position monitoring. Mining requirements, machine integration, testing. Final report, 20:7163 (R;DE;In German)

MINORITY GROUPS
See also LOW INCOME GROUPS
A report: A plan to establish Internet access points at Minority Campus sites for connection to a central computing facility, 20:9163 (R;US)
MOLIS: Minority On-Line Information Service: User's guide. Version 3.0/Release 3.0, 20:9128 (R;US)

MISGURNUS
See FISHES

MIST EXTRACTORS
Slanted baffle mist eliminator, 20:7337 (PA;US)

MM-0011
See NICKEL BASE ALLOYS

MODELS (OPTICAL)
See OPTICAL MODELS

MODELS (SCALE)
See SCALE MODELS

MOESSBAUER EFFECT
Emission Moessbauer spectroscopic studies on mixed valence states of Fe-57 atoms produced in Co-57 labelled trinuclear cobalt-iron carboxylates., 20:8157 (IA;MX)

MOISTURE GAGES
Calibration of neutron moisture gauges and their ability to spatially determine soil water content in environmental studies, 20:8238 (R;US)

MOLECULAR BIOLOGY
Computational molecular biology in logical perspective, 20:8559 (RA;US)
Evolution on rugged landscapes, 20:8561 (RA;US)
Just-in-time information forwarding: Biological systems viewed as Shannonian Communication Systems, 20:8562 (RA;US)
On the Schroedinger question, 20:8564 (RA;US)
The Environmental and Molecular Sciences Laboratory project – Continuous evolution in leadership, 20:7487 (R;US)

MOLECULAR FLUORESCENCE SPECTROSCOPY
See FLUORESCENCE SPECTROSCOPY

MOLECULAR ORBITAL MODEL
See MOLECULES

MOLECULES
Some thoughts of future experiments with the new generation of storage rings, 20:8965 (R;US)

MOLTEN CARBONATE FUEL CELLS
Cathodes
Lithium ferrate and lithium cobaltate cathodes for molten carbonate fuel cells, 20:7925 (RA;US)
Commercialization
Overview of MCFC commercialization strategy, 20:7939 (RA;US)
Status of 120-kW direct fuel cell product improvement and testing, 20:7943 (RA;US)
Status of Unocal product development testing, 20:7944 (RA;US)
The alliance to commercialize carbonate technology: A revitalized industry commitment to IMHEX® fuel cell commercialization, 20:7940 (RA;US)
Update: Commercialization of the direct fuel cell, 20:7938 (RA;US)
Cost
Overview of MCFC commercialization strategy, 20:7939 (RA;US)
Design
Status of 120-kW direct fuel cell product improvement and testing, 20:7943 (RA;US)
Status of 250 kW product development test at San Diego Gas & Electric, 20:7942 (RA;US)

Status of Santa Clara MCFC product development test, 20:7941 (RA;US)

Feasibility Studies
MCFC development for logistic fuel applications, 20:7936 (RA;US)

Performance
Investigation of wetting phenomena and oxidation/lithiation behavior of nickel in molten carbonate, 20:7935 (RA;US)
Status of Santa Clara MCFC product development test, 20:7941 (RA;US)

Performance Testing
Carbonate fuel cell analysis, 20:7926 (RA;US)

Research Programs
Molten carbonate fuel cell with high power density, 20:7927 (RA;US)
Multiply manifolded molten carbonate fuel cells, 20:7924 (RA;US)

Reviews
Fuel cells - an international perspective, 20:7945 (RA;US)

Seals
Pitting corrosion of aluminized seals in molten carbonate fuel cells, 20:7928 (RA;US)

Service Life
Carbonate fuel cell analysis, 20:7926 (RA;US)

Technology Assessment
Fuel cells - an international perspective, 20:7945 (RA;US)
Update: Commercialization of the direct fuel cell, 20:7938 (RA;US)

MOLTEN METAL-WATER REACTIONS
Steam explosion, premixing experiments with solid spheres, 20:7802 (RA;DE;In German)
Theoretical analyses of interactions between core melt and coolant, 20:7803 (RA;DE;In German)

MOLYBDENUM
Analysis of the composition of ion-beam irradiated elastomer using the Rutherford back scattering, 20:8166 (IA;RU;In Russian)
Epitaxial growth of bcc transition metal films and superlattices onto MgO (111), (011) and (001) substrates, 20:8071 (R;US)
Generation, detection and characterization of gas-phase transition metal aggregates and compounds. Final technical report, September 15, 1991–July 14, 1994, 20:8181 (R;US)

MOLYBDENUM 100
Two neutrino double-beta decay of ^{100}Mo to the first excited 0^+ state in ^{100}Ru, 20:8870 (R;US)

MOLYBDENUM ALLOYS
X-ray photoelectron spectroscopy analysis of cleaning procedures for synchrotron radiation beamline materials at the Advanced Photon Source, 20:8332 (R;US)

MONGRELS
See DOGS

MONIQUE EVENT
See CONTAINED EXPLOSIONS
NUCLEAR EXPLOSIONS

MONITORING
See also AIR POLLUTION MONITORING
RADIATION MONITORING
A survey of existing and emerging technologies for external detection of liquid leaks at the Hanford Site, 20:7340 (R;US)

MONITORING (RADIATION)
See RADIATION MONITORING

MONITORING NETWORK
See MONITORING

MONITORS (AIR POLLUTION)
See AIR POLLUTION MONITORS

MONITORS (BEAM)
See BEAM MONITORS

MONITORS (RADIATION)
See RADIATION MONITORS

MONITORS (REACTOR)
See REACTOR CONTROL SYSTEMS

MONOCHROMATORS
Cryogenic monochromator as a solution to undulator heat loads at third generation synchrotron sources, 20:8309 (R;US)

MONTANA
Improved recovery demonstration for Williston Basin carbonates. Quarterly report, June 1–September 30, 1994, 20:7223 (R;US)

MONTE CARLO METHOD
Algorithms for Events Selection in the Vertex Detector of the MPS Spectrometer, 20:9166 (R;XJ;In Russian)

MOROCCO
Study of radon-222 emanation from sedimentary phosphates and corresponding phosphogypsum. Temperature effect, 20:8491 (I;MA;In French)

MOTT SCATTERING
The Mott-Schwinger effect in neutron elastic scattering from ^{209}Bi, 20:8941 (R;AU)

MULE DEER
See DEER

MULTI-CHANNEL ANALYZERS
Design study for advanced flame quality indicator, 20:7956 (RA;US)
Digital stabilizer for multichannel analysis, 20:8365 (RA;IL)

MULTIPLICITY
Study of Features in Particle and Event Characteristics in Nucleus-Nucleus Interaction, 20:8932 (R;XJ;In Russian)

MULTIPOLE TRANSITIONS
The properties of Low-Lying States of ^{166} Er, 20:8865 (R;XJ;In Russian)

MULTIPROCESSING
See PARALLEL PROCESSING

MULTIPROCESSORS
See ARRAY PROCESSORS

MULTIWIRE PROPORTIONAL CHAMBERS
A manual sample changer for a 5 inch proportional detector counting system, 20:8364 (RA;IL)
A square 7.5 inch proportional guard detector, 20:8363 (RA;IL)

MUNICIPAL BUILDINGS
See PUBLIC BUILDINGS

MUNICIPAL WASTES
A study on resources survey and characteristic of wastes in Korea(II), 20:8047 (R;KR;In Korean)
Process development for energy and compost recovery from biogradable municipal solid waste, 20:7540 (R;KR;In Korean)
Prospects for pyrolysis technologies in managing municipal, industrial, and DOE cleanup wastes, 20:7542 (R;US)

MUON PAIRS
A high-energy high-luminosity $\mu^+ - \mu^-$ collider, 20:8284 (R;US)

MUON REACTIONS
The Possibility to Investigate J/Ψ production and Gluon Distributions Using Muon Beam of U-600, 20:8925 (R;XJ)

MUON-CATALYZED FUSION
A new concept to increase muon cycle rate in muon catalyzed fusion, 20:9050 (IA;IR;In English, Persian)

MUONS
Supersymmetric magnetic moments sum rules and spontaneous supersymmetry breaking, 20:8830 (R;XA)

MUSEUMS
See EDUCATIONAL FACILITIES

MWPC
See MULTIWIRE PROPORTIONAL CHAMBERS

N

NAI DETECTORS
Design (Ge-BGO+NaI(Tl)) of Anti-Compton Spectrometer, 20:8385 (R;XJ;In Russian)
The Calculation of the Main Characteristics of Ge(Li)-NaI(Tl) Anti-Compton Spectrometer by Monte Carlo Method, 20:8384 (R;XJ;In Russian)

NAPHTHALENE
Molecular catalytic coal liquid conversion. Quarterly progress report, 20:7130 (R;US)

NATIONAL REACTOR TESTING STATION
See IDAHO NATIONAL ENGINEERING LABORATORY

NATIONAL RENEWABLE ENERGY LABORATORY
Alternative futures for the Department of Energy National Laboratories, 20:7881 (R;US)
National Renewable Energy Laboratory information resources catalogue. A collection of energy efficiency and renewable energy information resources, 20:7875 (R;US)
Overview of solar detoxification activities in the United States, 20:8463 (R;US)
Renewable Energy Demonstration Project by the National Renewable Energy Laboratory and the General Services Administration, 20:7586 (R;US)

NATIONAL SYNCHROTRON LIGHT SOURCE
See NSLS

NATURAL ACTIVITY
See NATURAL RADIOACTIVITY

NATURAL GAS
A coal-fired combustion system for industrial process heating applications. Quarterly technical progress report, April 1994–June 1994, 20:7172 (R;US)
Aerovalve pulse combustion: Technical note, 20:8266 (R;US)
Dynamic simulation of the liquefaction section in baseload LNG plants, 20:8254 (R;NO)
Energy and Technology Review, 20:9129 (R;US)
Gas cooling - a worldwide overview, 20:7995 (RA;US)
Model documentation natural gas transmission and distribution model (NGTDM) of the national energy modeling system. Volume II: Model developer's report, 20:7249 (R;US)
Petroleum marketing annual 1993, 20:7233 (R;US)
Study on the CNG storage method using activated adsorbent and CNG combustion technology for vehicles, 20:8012 (R;KR;In Korean)
Tax revenue and innovations in natural gas supply: New Mexico, 20:7251 (R;US)
The outlook for natural gas in Germany, 20:7250 (R;NO)
The perspectives of Norwegian petroleum resources, 20:7194 (R;NO)
Winter fuels report, 20:7235 (R;US)
Winter fuels report. Week ending: January 20, 1995, 20:7885 (R;US)

NATURAL GAS DEPOSITS
Models of natural fracture connectivity – Implications for reservoir permeability. Final report, 20:8649 (R;US)

NATURAL GAS DISTRIBUTION SYSTEMS
Model documentation natural gas transmission and distribution model (NGTDM) of the national energy modeling system. Volume II: Model developer's report, 20:7249 (R;US)
Rehabilitation of two gas pipes crossing the river Nemunas in Kaunas, Lithuania. Final report, 20:7255 (R;DK)

NATURAL GAS FUEL CELLS
Fuel cells - an international perspective, 20:7945 (RA;US)
Macrocyclic redox promoters for direct methanol fuel cells, 20:7932 (RA;US)

NATURAL GAS GATHERING SYSTEMS
See NATURAL GAS DISTRIBUTION SYSTEMS

NATURAL GAS INDUSTRY
FIGAWA. Annual report 1991, 20:7901 (I;DE;In German)

NATURAL GAS WELLS
Development of a cost effective environment compliance technology for stripper brine wells. Quarterly report, July 1, 1994–September 30, 1994, 20:7239 (R;US)

NATURAL RADIOACTIVITY
Study of isotopic desequilibrium of natural radioactive series in granitic environment: Pluton of El Berrocal (Toledo), 20:8475 (R;ES;In Spanish)

NATURAL URANIUM
Detection limits for differential measuring methods for natural uranium, 20:8361 (RA;IL)

NAVIER-STOKES EQUATION
See NAVIER-STOKES EQUATIONS

NAVIER-STOKES EQUATIONS
A domain decomposition study of massively parallel computing in compressible gas dynamics, 20:8255 (R;US)
Finite elements volumes methods: applications to the Navier-Stokes equations and convergence results, 20:8251 (R;FR;In French)
Verification of computational aerodynamic predictions for complex hypersonic vehicles using the INCA™ code, 20:8258 (R;US)

NEGATONS
See ELECTRONS

NEGATRONS
See ELECTRONS

NEGEV NUCLEAR RESEARCH CENTER
Computerized central control and supervision room, 20:7708 (RA;IL)

NEODYMIUM LASERS
Development of 200 W class Nd:YAG laser with unstable resonator, 20:8233 (R;KR;In Korean)
Laser beam characterization results for a high power CW Nd:YAG laser, 20:8276 (R;US)
Reduction in fiber damage thresholds due to static fatigue, 20:8131 (R;US)

NEODYMIUM OXIDES
Processing of single- and multi-domain $YBa_2Cu_3O_x$ bulk materials for levitation applications by $Nd_{1+x}Ba_{2-x}Cu_3O_y$ seeding, 20:8118 (R;US)

NEOPLASMS
Real-time dosimetry for boron-neutron capture therapy, 20:8593 (R;US)

NETWORKS (COMPUTER)
See COMPUTER NETWORKS

NEUTRALIZATION (PHYSICAL)
See RECOMBINATION

NEUTRINO OSCILLATION
Long-baseline neutrino oscillation experiments, 20:8823 (R;US)

NEUTRON CAPTURE
See NEUTRON REACTIONS

NEUTRON CAPTURE THERAPY
Real-time dosimetry for boron-neutron capture therapy, 20:8593 (R;US)

NEUTRON DOSIMETRY
Intercomparison of high energy neutron personnel dosimeters, 20:8395 (R;US)

NEUTRON MATTER
See NUCLEAR MATTER

NEUTRON MOISTURE METERS
See MOISTURE GAGES

NEUTRON RADIOGRAPHY
Modulation transfer function measurement for the film-converter imaging technique in neutron radiography, 20:8945 (IA;IR;In English, Persian)

NEUTRON REACTIONS
A theoretical calculation of n-T scattering cross sections, 20:8899 (RA;CN)
Biological effectiveness of neutrons: Research needs, 20:8627 (R;US)
CFUP1- a program for calculating neutron or charged particle induced reactions on fissile nuclei in energy range up to 35 MeV, 20:9156 (RA;CN)
CMUP2- a program for calculating neutron or charged particle induced reactions in energy range up to 50 MeV, 20:9155 (RA;CN)
Gamma-ray measurements at the WNR white neutron source, 20:8937 (R;US)
Gamma-ray production experiments at the WNR white neutron source, 20:8938 (R;US)
Neutron scattering studies in the actinide region. Progress report, August 1, 1991–July 31, 1994, 20:8906 (R;US)
The establishment of EXFOR nuclear data based system and experimental neutron data library, 20:8873 (RA;CN)

NEUTRON SOURCE FACILITIES
Advanced Neutron Source (ANS) Project progress report, FY 1994, 20:7533 (R;US)

NEUTRON SOURCES
Deuterons
Summary of ESNIT, 20:7525 (IA;DE)
The high intensity D-Li source, 20:7526 (IA;DE)

Lithium
Summary of ESNIT, 20:7525 (IA;DE)
The high intensity D-Li source, 20:7526 (IA;DE)
Mirrors
A Wide Spectrum Neutron Polarizer for a Pulsed Neutron Source, 20:8380 (R;XJ)
Muon-Catalyzed Fusion
Proposal of an intense 14 MeV neutron source based on μCF, 20:7529 (IA;DE)
Plasma Potential
Mirror based fusion neutron sources for fusion material testing, 20:9121 (IA;DE)
Mirror beam plasma neutron source, 20:9120 (IA;DE)
Mirror type plasma neutron source, 20:9119 (IA;DE)
Polarization
A Wide Spectrum Neutron Polarizer for a Pulsed Neutron Source, 20:8380 (R;XJ)
Small Angle Scattering
New Development of a Small-Angle Neutron Scattering Instrument for a Pulsed Neutron Source, 20:8379 (R;XJ)
Spallation
Some information and remarks concerning plans to build a European spallation source for neutron scattering application, 20:7530 (IA;DE)
Storage Facilities
Production and Storage of Ultracold Neutrons at Pulse Neutron Sources with Low Repetition Rates, 20:7521 (R;XJ)
Thermonuclear Reactor Materials
The role of intense neutron sources and other irradiation facilities in materials development for fusion, 20:9117 (IA;DE)
Thermonuclear Reactors
The role of neutron irradiation facilities, 20:9116 (IA;DE)
Time-Of-Flight Spectrometers
New Development of a Small-Angle Neutron Scattering Instrument for a Pulsed Neutron Source, 20:8379 (R;XJ)
Tritons
Target design analysis for an intense T-H_2O neutron source, 20:7528 (IA;DE)
The intense T-H_2O neutron source, 20:7527 (IA;DE)
Water
Target design analysis for an intense T-H_2O neutron source, 20:7528 (IA;DE)
The intense T-H_2O neutron source, 20:7527 (IA;DE)

NEUTRON SPECTRA
Lawrence Livermore pulsed sphere benchmark analysis of MCNP™ ENDF/B-VI, 20:8949 (R;US)

NEUTRON SPECTROMETERS
Choice of cold moderator for the DIN-2PI spectrometer, 20:8346 (R;RU;In Russian)

NEUTRON TRANSPORT
Evaluation of the SMOLENSK-3 NPP shutdown system. Phase I: code implementation and testing. First progress report, 20:7667 (R;CH)
Lawrence Livermore pulsed sphere benchmark analysis of MCNP™ ENDF/B-VI, 20:8949 (R;US)
Results of the MCNP analysis of 20/20 LEU fuel for the Oregon State University TRIGA Reactor, 20:7765 (R;US)

NEUTRONS
See also THERMAL NEUTRONS
Biological effectiveness of neutrons: Research needs, 20:8627 (R;US)

NEVADA
Community radiation monitoring program. Annual report, October 1, 1992–September 30, 1993, 20:8435 (R;US)

NEVADA TEST SITE
Area 5 Site characterization project report, FY 1994, 20:7443 (R;US)
Classification of groundwater at the Nevada Test Site, 20:8471 (R;US)
Community radiation monitoring program. Annual report, October 1, 1992–September 30, 1993, 20:8435 (R;US)
High resolution seismic imaging of Rainier Mesa using surface reflection and surface to tunnel tomography, 20:8428 (R;US)
Identification of potential groundwater flow paths using geological and geophysical data, 20:8650 (R;US)
Potential hydrologic characterization wells in Amargosa Valley, 20:8473 (R;US)
The application of borehole logging to characterize the hydrogeology of the Faultless site, Central Nevada Test Area, 20:8472 (R;US)

NEW ENGLAND
See USA

NEW JERSEY
Pipeline corridors through wetlands – Impacts on plant communities: Little Timber Creek Crossing, Gloucester County, New Jersey. Topical report, August 1991–January 1993, 20:7253 (R;US)

NEW MEXICO
Evolution of patterns of regional groundwater flow in southeastern New Mexico: Response to post-Pleistocene changes in climate, 20:7294 (R;US)
Tax revenue and innovations in natural gas supply: New Mexico, 20:7251 (R;US)

NEW YORK CITY
Energy use and domestic hot water consumption - Phase 1. Final report, 20:7986 (R;US)

NICKEL
Hydrogen trapping in nickel pre-implanted with helium, 20:9101 (RA;IL)
Investigation of wetting phenomena and oxidation/lithiation behavior of nickel in molten carbonate, 20:7935 (RA;US)
New vision on surface diffusion, 20:8103 (R;US)

NICKEL 59 TARGET
Identification of the Doubly Magic Nucleus ^{100}Sn in the Reaction ^{112}Sn (63 MeV/Nucleon) + ^{nat} Ni, 20:8914 (RA;XJ)

NICKEL 61
Nuclear data sheets update for A = 61, 20:8851 (RA;CN)

NICKEL ALLOYS
See also NICKEL BASE ALLOYS
$LaNi_5$ in a copper matrix, 20:8084 (RA;IL)
Study of point defects and matter transport in cubic face centered concentrated alloys, 20:8073 (R;FR;In French)

NICKEL BASE ALLOYS
Synthesis of Ni_3Al and NiAl intermetallics, 20:8075 (R;US)

NICKEL COMPLEXES
XAS studies of Ni(I), Ni(II), and Ni(III) complexes, 20:8179 (R;US)

NIGER RIVER
Comment on the isotopic measures of Niger in Banankoro and of Bani in the Douna-San region, 20:8535 (RA;XA;In French)

NIOBATES
Transient radiation-induced absorption in materials for the DOI laser, 20:8278 (R;US)

NIOBIUM
Epitaxial growth of bcc transition metal films and superlattices onto MgO (111), (011) and (001) substrates, 20:8071 (R;US)
Generation, detection and characterization of gas-phase transition metal aggregates and compounds. Final technical report, September 15, 1991–July 14, 1994, 20:8181 (R;US)

NITRATES
See also AMMONIUM NITRATES
SODIUM NITRATES
Comparison of denuder systems, a virtual impactor and a Berner low-pressure impactor for determination of nitrate aerosol, 20:8445 (RA;FI)
F-Area Acid/Caustic Basin groundwater monitoring report: Third quarter 1994, 20:8520 (R;US)

NITRIC ACID
Basic TRUEX process for Rocky Flats Plant, 20:7289 (R;US)
Comparison of denuder systems, a virtual impactor and a Berner low-pressure impactor for determination of nitrate aerosol, 20:8445 (RA;FI)
Rejuvenation and recovery of electroplating acids using the WADR technology, 20:8038 (R;US)

NITRIC OXIDE
Carbon monoxide oxidation over three different states of copper: Development of a model metal oxide catalyst, 20:8063 (R;US)

Correlations for the NO $A^2\Sigma^+$ electronic quenching cross-section, 20:8963 (R;US)
Direct catalytic decomposition of nitric oxide. Quarterly technical progress report number 12, July–September, 1994, 20:8436 (R;US)

NITROGEN
Controls over nutrient flow through plants and microbes in Arctic tundra. Final technical report, 20:8586 (R;US)

NITROGEN 14 TARGET
Gamma-ray measurements at the WNR white neutron source, 20:8937 (R;US)

NITROGEN NITRIDES
See NITROGEN

NITROGEN OXIDES
See also NITRIC OXIDE
NITROUS OXIDE
Advanced separation technology for flue gas cleanup. Quarterly technical report No. 10, 20:7635 (R;US)
Baseline NO_x emissions during combustion of wood-derived pyrolysis oils, 20:7560 (R;US)
Cross-flow, filter-sorbent-catalyst for particulate, SO_2 and NO_x control. Final report, 20:7171 (R;US)
Development of an energy efficient industrial gas combustion system, 20:7258 (R;KR;In Korean)
Development of high efficient process for simultaneous removal of SOx and NOx from flue gas (III), 20:7970 (R;KR;In Korean)
Electric Power Research Institute: Environmental Control Technology Center report to the Steering Committee, August 1994. [Monthly report], 20:7160 (R;US)
Electric Power Research Institute: Environmental Control Technology report to the Steering Committee, July 1994. [Monthly report], 20:7159 (R;US)
Energy research - as seen by industry, 20:7841 (IA;CH)
Evaluation of the prerequisites to adapt to the law on environmental charges on emission of nitrogen oxides in energy production at combustion plants producing 25-50 GWh/year, 20:7867 (R;SE;In Swedish)
Investigation of combined SO_2/NO_x removal by Ceria sorbents. Quarterly technical progress report, July 1994–September 1994, 20:7154 (R;US)
Microbial reduction of SO_2 and NO_x as a means of by-product recovery/disposal from regenerable processes for the desulfurization of flue gas. Technical progress report, September 11, 1992–December 11, 1992, 20:7155 (R;US)
Nitrogen oxides (NO_x) and oil burners, 20:7951 (RA;US)

NITROUS OXIDE
Release of dinitrous oxide from intertidal sediments - illustrated by the example of the Elbe estuary (Muehlenberger Loch) and coastal tidal region (Koenigshafen/Sylt), 20:8447 (R;DE;In German)

NO. 2 FUEL OIL
See HEATING OILS

NON-PROLIFERATION TREATY
Director's series on proliferation, 20:8068 (R;US)

NORTH DAKOTA
Improved recovery demonstration for Williston Basin carbonates. Quarterly report, June 1–September 30, 1994, 20:7223 (R;US)

NORTH KOREA
A study on the status of nuclear development and utilization in North Korea, 20:9143 (R;KR;In Korean)

NORTHERN IRELAND
See UNITED KINGDOM

NORWAY
Lightning protection of wind turbine generator systems. Service experience from Norway and proposed solutions to reduce lightning damage, 20:7612 (RA;DK)
The perspectives of Norwegian petroleum resources, 20:7194 (R;NO)

NOSE CONES
Crushable structure performance determined from reconstructed dynamic forces during impact tests, 20:8424 (R;US)

NOVO VORONEZH-3 REACTOR
See WWER-3 REACTOR

NOVO VORONEZH-5 REACTOR
See WWER-5 REACTOR

NOZZLES
The development of optimal design technology in robotics -The development of advanced robotics for the nuclear industry-, 20:8234 (R;KR;In Korean)

NREL
See NATIONAL RENEWABLE ENERGY LABORATORY

NRTS
See IDAHO NATIONAL ENGINEERING LABORATORY

NSLS
FT-IR microscopical analysis with synchrotron radiation: The microscope optics and system performance, 20:8981 (R;US)
NSLS control system upgrade, 20:8311 (R;US)
Operation of a small-gap undulator on the NSLS X-ray Ring, 20:8312 (R;US)

NUCLEAR ACCIDENTS
See ACCIDENTS

NUCLEAR ATTACKS
See NUCLEAR WEAPONS

NUCLEAR CONTROVERSY
See HUMAN POPULATIONS

NUCLEAR DATA COLLECTIONS
Benchmark analysis of MCNP™ ENDF/B-VI iron, 20:8948 (R;US)
Communication of nuclear data progress: No.6 Supplement (1992), 20:8881 (R;CN)
Communication of nuclear data progress: No.9 (1993), 20:8897 (R;CN)
Development of nuclear theory model for measuring and evaluating basic nuclear data, 20:9191 (R;KR;In Korean)
Establishment of nuclear data evaluation system (I), 20:9193 (R;KR;In Korean)
Production and testing of the VITAMIN-B6 fine group and the BUGLE-93 broad-group neutron/photon cross-section libraries derived from ENDF/B-VI nuclear data, 20:7648 (R;US)
Progress on Chinese evaluated nuclear parameter library (CENPL) (II), 20:8843 (RA;CN)
Progress report on nuclear data research in the Federal Republic of Germany for the period April 1, 1993 to March 31, 1994, 20:9138 (R;DE)

NUCLEAR DECAY
Progress on frequently useful nuclear decay data library, 20:8868 (RA;CN)
Progress on nuclear structure and decay data evaluation for A-chain in China, 20:8850 (RA;CN)

NUCLEAR ENGINEERING
A study on international nuclear cooperation and technology self-reliance strategies for nuclear development in other countries, 20:9146 (R;KR;In Korean)
Analysis of the international environment for the national nuclear technology development in the post-coldwar era, 20:9140 (R;KR;In Korean)

NUCLEAR EXPLOSION DETECTION
A study of small explosions and earthquakes during 1961–1989 near the Semipalatinsk Test Site, Kazakhstan, 20:8429 (R;US)

NUCLEAR EXPLOSIONS
Community radiation monitoring program. Annual report, October 1, 1992–September 30, 1993, 20:8435 (R;US)
HAZEBROOK, containment data report, 20:8427 (R;US)
KERNVILLE, containment data report, 20:8426 (R;US)

NUCLEAR EXPLOSIVES
Violent reaction source term study, 20:8425 (R;US)

NUCLEAR FACILITIES
See also FEED MATERIALS PLANTS
FUEL FABRICATION PLANTS
FUEL REPROCESSING PLANTS
ISOTOPE SEPARATION PLANTS
NUCLEAR POWER PLANTS
RADIOACTIVE WASTE FACILITIES
Alpha spectral analysis via artificial neural networks, 20:7453 (R;US)
Estimation and characterization of decontamination and decommissioning solid waste expected from the Plutonium Finishing Plant, 20:7368 (R;US)

Hazards assessment document for receiving basin for offsite fuel (244-H) and resin regeneration facility (245-H) (RBOF/RRF), 20:8637 (R;US)
Overall analysis of meteorological information in the Daeduk nuclear complex, 20:9142 (R;KR;In Korean)
Radiation exposure due to gamma-ray submersion, 20:7753 (R;DE;In German)
Reliability studies by fast electronic simulation. Realization of an apparatus of configuration made by computer in function of the model to study, 20:7707 (R;FR;In French)
Safety principles for plutonium facilities in France, 20:7786 (RA;XA)
Selected legal documents in the field of peaceful uses of nuclear energy in the Czech Republic, 20:7882 (I;CZ;In Czech)

NUCLEAR FUEL ELEMENTS
See FUEL ELEMENTS

NUCLEAR FUELS
See also DISPERSION NUCLEAR FUELS
LIQUID METAL FUELS
SPENT FUELS
Technology development for nuclear material safeguards -A study on the direct use of spent PWR fuel in CANDU-, 20:7510 (R;KR;In Korean)
The development of nuclear fuel for the future, 20:7704 (R;KR;In Korean)

NUCLEAR LIABILITY
A study on the establishment of national nuclear foreign policy - with reference to the strategy on the NPT extension and analysis of nuclear liability-, 20:9141 (R;KR;In Korean)

NUCLEAR MATERIALS MANAGEMENT
Selected legal documents in the field of peaceful uses of nuclear energy in the Czech Republic, 20:7882 (I;CZ;In Czech)
Technology development for nuclear material accountability, 20:7509 (R;KR;In Korean)
Vault Safety and Inventory System users manual, PRIME 2350. Revision 1, 20:7512 (R;US)

NUCLEAR MATTER
Pseudo-Goldstone modes in isospin-asymmetric nuclear matter, 20:8853 (R;US)

NUCLEAR MEDICINE
Nuclear techniques in medicine, 20:8594 (R;AU)

NUCLEAR OPERATORS
A study on the radiation monitoring for the personnel, 20:8617 (R;KR;In Korean)

NUCLEAR PHYSICS
INPL annual report 1992-1993, 20:9147 (R;FR;In French)
Nuclear Science Division: 1993 Annual report, 20:8844 (R;US)

NUCLEAR POWER
Large-scale future nuclear power and the problem of RAW handling, 20:7355 (IA;CH)

NUCLEAR POWER PLANTS
Alarm Systems
Operation support systems in nuclear power plants. Diagnostic aids: Alarm logic systems, 20:7726 (RA;XA)

Computer Codes
The development of nuclear plant analysis code TASS (Transients and setpoints simulation), 20:9169 (R;KR;In Korean)

Computer Networks
The concept of an information support system for operational personnel of operating nuclear power plants, 20:7720 (RA;XA)

Computerized Control Systems
Westinghouse computer-based operator support systems, 20:7710 (RA;XA)

Control Rooms
Basic principles of providing operator information support for power plant control of the VPBER-600 reactor plant, 20:7731 (RA;XA)
Generic information display system for the control centre of the nuclear power station power unit, 20:7723 (RA;XA)
Westinghouse computer-based operator support systems, 20:7710 (RA;XA)

Diagnostic Techniques
A model based diagnostic system for the identification of malfunctioning components using a constraint propagation paradigm, 20:7728 (RA;XA)

Display Devices
A double-channelled safety critical process visualization, 20:7724 (RA;XA)
Generic information display system for the control centre of the nuclear power station power unit, 20:7723 (RA;XA)
Operation support systems in nuclear power plants. Diagnostic aids: Alarm logic systems, 20:7726 (RA;XA)
The concept of an information support system for operational personnel of operating nuclear power plants, 20:7720 (RA;XA)

Environmental Effects
Analysis of chemical factors affecting marine ecosystem around nuclear power plant, 20:7755 (R;KR;In Korean)

Environmental Impacts
A study on the ocean circulation and thermal diffusion near a nuclear power plant, 20:7757 (R;KR;In Korean)
Development of hydrogeological modelling approaches for assessment of consequences of hazardous accidents at nuclear power plants, 20:8499 (R;US)

Expert Systems
Current practices and future trends in expert system developments for use in the nuclear industry. Report of a specialists meeting held in Tel Aviv, Israel, 11-15 October 1993, 20:7739 (R;XA)
Rex: A methodology used for the structured processing of nuclear power plant operation experience feedback, principles and extension to case based reasoning, 20:7746 (RA;XA)

Fatigue
Development of fatigue monitoring system in nuclear power plants, 20:7696 (R;KR;In Korean)

Human Factors
Critical methodological issues in evaluation of operator support systems, 20:7737 (RA;XA)
The development of human behaviour analysis techniques -The development of human factors technologies-, 20:9145 (R;KR;In Korean)

Human Factors Engineering
Organizational factors and nuclear power plant safety, 20:7780 (R;US)

Information Systems
The concept of an information support system for operational personnel of operating nuclear power plants, 20:7720 (RA;XA)

Inspection
Core damage frequency observations and insights of LWRs based on the IPEs, 20:7649 (R;US)
Human event observations in the individual plant examinations, 20:7823 (R;US)

Knowledge Base
Qualitative processing of uncertainty, conflicts and redundancy in knowledge bases, 20:7742 (RA;XA)

Maintenance
A preliminary study for the life extension of nuclear power plants, 20:7694 (R;KR;In Korean)

Man-Machine Systems
Critical methodological issues in evaluation of operator support systems, 20:7737 (RA;XA)
IAEA co-ordinated research programme on operator support systems in nuclear power plants, 20:9197 (RA;XA)
Man-machine systems in the nuclear power industry, 20:7735 (RA;XA)
Operator support systems in nuclear power plants. Proceedings of a specialists meeting held in Moscow, Russian Federation, 17-21 May 1993, 20:7709 (R;XA)

Materials Testing
Material performance evaluation -Development of the advanced nuclear materials-, 20:8264 (R;KR;In Korean)

Neural Networks
Application of neural networks in nuclear safety analysis, 20:7641 (RA;XA)
The status of application of neural networks in the nuclear industry, 20:7741 (RA;XA)

Radiation Protection
Safety assessment principles for nuclear plants, 20:7643 (I;CZ;In Czech)
Reactor Control Systems
Classification of NPP operator support systems and problems with their implementation, 20:7716 (RA;XA)
Intelligence operator support system, 20:7725 (RA;XA)
Reactor Monitoring Systems
Classification of NPP operator support systems and problems with their implementation, 20:7716 (RA;XA)
On-line operator support system integrated with monitoring and diagnosis system, 20:7714 (RA;XA)
Reactor Safety
Status of safety issues at licensed power plants: TMI Action Plan requirements, unresolved safety issues, generic safety issues, other multiplant action issues. Supplement 4, 20:7819 (R;US)
Regulatory Guides
Budget estimates - fiscal years 1996-1997, 20:7682 (R;US)
Reliability
Complex probabilistic estimation of seismic resistance of nuclear power plants, 20:8495 (R;RU;In Russian)
Reliability studies by fast electronic simulation. Realization of an apparatus of configuration made by computer in function of the model to study, 20:7707 (R;FR;In French)
Robots
The development of robotic system for the nuclear power plants -The development of advanced robotics for the nuclear industry-, 20:8236 (R;KR;In Korean)
Safety
Application of neural networks in nuclear safety analysis, 20:7641 (RA;XA)
Safety Analysis
Organizational factors and nuclear power plant safety, 20:7780 (R;US)
Uncertainty and sensitivity analysis of chronic exposure results with the MACCS reactor accident consequence model, 20:7820 (R;US)
Uncertainty and sensitivity analysis of early exposure results with the MACCS Reactor Accident Consequence Model, 20:7821 (R;US)
Seismic Effects
Complex probabilistic estimation of seismic resistance of nuclear power plants, 20:8495 (R;RU;In Russian)
Seismic Isolation
Understanding earthquake design criteria used in Japan, 20:7781 (R;US)
Site Selection
Development of hydrogeological modelling approaches for assessment of consequences of hazardous accidents at nuclear power plants, 20:8499 (R;US)
Systems Analysis
Reliability studies by fast electronic simulation. Realization of an apparatus of configuration made by computer in function of the model to study, 20:7707 (R;FR;In French)

NUCLEAR POWER STATIONS
See NUCLEAR POWER PLANTS

NUCLEAR REACTIONS
See also CHARGE-EXCHANGE REACTIONS
COLD FUSION
FISSION
HADRON REACTIONS
HEAVY ION FUSION REACTIONS
PHOTONUCLEAR REACTIONS
Theoretical progress at CNDC theory group, 20:8871 (RA;CN)

NUCLEAR REACTORS
See REACTORS

NUCLEAR SAFETY
See RADIATION PROTECTION

NUCLEAR SHIPS
Potential risks of nuclear ships, 20:7784 (R;DK)

NUCLEAR STRUCTURE
F-SPIN PURITY OF 2^+_1 states in even-even nuclei, 20:8857 (RA;IL)
Nuclear Structure by Laser Spectroscopy, 20:8863 (R;XJ)
Progress on nuclear structure and decay data evaluation for A-chain in China, 20:8850 (RA;CN)

NUCLEAR THEORY
Theoretical progress at CNDC theory group, 20:8871 (RA;CN)

NUCLEAR TRANSMUTATION
See TRANSMUTATION

NUCLEAR WASTES
See RADIOACTIVE WASTES

NUCLEAR WEAPON TESTS
See NUCLEAR EXPLOSIONS

NUCLEAR WEAPONS
CALSON Process, 20:9195 (R;US)

NUCLEI
See also EVEN-EVEN NUCLEI
HEAVY NUCLEI
INTERMEDIATE MASS NUCLEI
LIGHT NUCLEI
ODD-ODD NUCLEI
A new set of average level spacings for s-wave resonance, 20:8852 (RA;CN)

NUCLEIC ACIDS
See also DNA
RNA
Biopolymer sequences and structures, 20:8565 (RA;US)

NUCLEON-NUCLEON INTERACTIONS
See also PROTON-NUCLEON INTERACTIONS
Complex conjugate pairs in stationary Sturmians, 20:8745 (R;AU)
Coulomb correction calculations of pp Bremsstrahlung, 20:8821 (R;AU)
Density dependent effective interactions, 20:8820 (R;AU)
JINR rapid communications. Collection 4, 20:8916 (R;XJ;In English, Russian)
Nuclear magnetic quadrupole moments in single-particle approximation, 20:8849 (R;RU)

NUCLEON-NUCLEON POTENTIAL
Nucleon Correlation Effects on Y-Scaling Quantities in Nuclei, 20:8859 (RA;XJ)

NUCLEONS
See also NEUTRONS
PROTONS
Once more on the radiative corrections to the nucleon structure functions in QCD, 20:8758 (R;XA)

NUTS (MECHANICAL)
See FASTENERS

O

OAK RIDGE GASEOUS DIFFUSION PLANT
See ORGDP

OAK RIDGE NATIONAL LABORATORY
See ORNL

OAK RIDGE RESERVATION
Airborne geophysical survey of the Oak Ridge Reservation, Tennessee, 20:7445 (R;US)
Approach and strategy for performing ecological risk assessments for the U.S. Department of Energy's Oak Ridge Reservation: 1994 revision, 20:7473 (R;US)
Development of a three-dimensional groundwater flow model for Western Melton Valley: Application of P-FEM on a DOE waste site, 20:7451 (R;US)
Estimating exposure of terrestrial wildlife to contaminants, 20:8641 (R;US)
Tritium tracer movement as an analogy for pump and treat remediation, 20:7485 (R;US)
Waste generation forecast for DOE-ORO's Environmental Restoration OR-1 Project: FY 1995-FY 2002, September 1994 revision, 20:7313 (R;US)

OCCUPATIONAL SAFETY
Level 1: Incidental crane operator's and incidental rigger's manual. Revision, 20:7480 (R;US)
Research priorities for occupational radiation protection, 20:8626 (R;US)

WAG 2 remedial investigation and site investigation site-specific work plan/health and safety checklist for the ecological assessment task, Kingfisher Study, 20:7482 (R;US)
WAG 2 remedial investigation and site investigation site-specific work plan/health and safety checklist for the sediment transport modeling task, 20:7481 (R;US)

OCEANIC CIRCULATION
Onset time and strength of oceanic deep convection diagnosed from an ocean large-eddy simulation model, 20:8546 (R;US)
Use of explicit finite-difference schemes and lateral open boundary conditions in numerical ocean models, 20:8652 (R;NO)

OCEANOGRAPHY
[Circulation and exchange processes on the South Atlantic Bight Continental Shelf]. [Progress summary for 1986], 20:8524 (R;US)

OCEANS
See SEAS

OCTANOLS
Development of radiation-sterilized mannitol salt agar dip slide kit, 20:8599 (RA;IL)

OCTYL ALCOHOLS
See OCTANOLS

ODD-ODD NUCLEI
See also ALUMINIUM 26
COBALT 60
DEUTERIUM
Odd Proton and Neutron Shells in Light Nuclei, 20:8862 (R;XJ)

ODOCOILEUS
See DEER

OFF-PEAK ENERGY STORAGE
Hourly simulations of hybrid renewable energy systems for San Cristobal/Santa Barbara, Guatemala, 20:8049 (R;US)

OFFICE BUILDINGS
Daylighting in business buildings. State report, 20:7985 (R;DK;In Danish)

OIL BURNERS
Nitrogen oxides (NO_x) and oil burners, 20:7951 (RA;US)
The fan atomized burner - status and application testing, 20:7952 (RA;US)

OIL FIELDS
Assist in the recovery of bypassed oil from reservoirs in the Gulf of Mexico. Quarterly status report (final), July 1–September 30, 1994, 20:7201 (R;US)
Post waterflood CO_2 miscible flood in light oil, fluvial - dominated deltaic reservoirs. Technical progress report, 4th quarter, fiscal year 1994, July 1, 1994–September 30, 1994, 20:7217 (R;US)
Productivity and injectivity of horizontal wells. Quarterly report, July 1, 1994–September 30, 1994, 20:7205 (R;US)

OIL FURNACES
Canadian R&D on oil-fired combustion systems, 20:7950 (RA;US)
Catalase as an indicator of microbial contamination in fuel oil, 20:7954 (RA;US)
Development of oil heat chimney venting tables, 20:7958 (RA;US)
Oil heat technology - efficiency training manual, 20:7948 (RA;US)
Part I - Oil heat technology research and development. Part II - NAECA 2002, what, when, and who?, 20:7947 (RA;US)
Residential fuel quality study (Part II), 20:7953 (RA;US)
Results of the validation of the oil heat vent analysis program (OHVAP), 20:7957 (RA;US)
The fan atomized burner - status and application testing, 20:7952 (RA;US)
Update on the build with oil program and the oilheat manufacturers association, 20:7949 (RA;US)

OIL RESIDUES
See PETROLEUM RESIDUES

OIL SHALE WASTE WATER
See WASTE WATER

OIL SPILL FINGERPRINTING
See OIL SPILLS

OIL SPILLS
Experimental investigation of the migration of the miscible and immiscible components following a light oil spill, 20:8506 (RA;DK)

OIL WELLS
Carbon Dioxide Injection
CO_2 Huff-n-Puff process in a light oil shallow shelf carbonate reservoir. Quarterly technical progress report, 3rd quarter, 1994, 20:7224 (R;US)

Caustic Flooding
Detailed evaluation of the West Kiehl alkaline-surfactant-polymer field project and it's application to mature Minnelusa waterfloods. Technical progress report, July–September, 1994, 20:7203 (R;US)

Directional Drilling
Recovery of bypassed oil in the Dundee Formation using horizontal drains. Quarterly report, 4th quarter, FY 1994, 20:7222 (R;US)

Enhanced Recovery
Improved secondary recovery demonstration for the sooner unit. 3rd Quarter technical report, calendar year 1994, June 1, 1994–September 30, 1994, 20:7215 (R;US)
Surfactant loss control in chemical flooding: Spectroscopic and calorimetric study of adsorption and precipitation on reservoir minerals. Quarterly technical progress report, April 1, 1994–June 30, 1994, 20:7210 (R;US)

Flow Models
Gypsy Field project in reservoir characterization. Quarterly progress report, May 19–September 30, 1994, 20:7193 (R;US)

Fluid Injection
Improving reservoir conformance using gelled polymer systems. Quarterly progress report, July 1–September 30, 1994, 20:7207 (R;US)
Responsive copolymers for enhanced petroleum recovery. Quarterly technical progress report, June 23–September 21, 1994, 20:8180 (R;US)

Fluid Injection Processes
CO_2 Huff-n-Puff process in a light oil shallow shelf carbonate reservoir. Quarterly technical progress report, 3rd quarter, 1994, 20:7224 (R;US)

Gas Injection
Application of reservoir characterization and advanced technology to improve recovery and economic in a lower quality shallow shelf carbonate reservoir. Third quarter 1994, August 3, 1994–September 30, 1994, 20:7225 (R;US)
Research program on fractured petroleum reservoirs. Quarterly progress report, July 1–September 30, 1994, 20:7206 (R;US)
West Hackberry Tertiary Project. Quarterly technical progress report, June 3, 1994–September 2, 1994, 20:7218 (R;US)
West Hackberry tertiary project. Quarterly technical progress report, September 3, 1994–December 2, 1994, 20:7219 (R;US)

In-Situ Combustion
Field application of in situ combustion – past performance/future application: Proceedings, 20:7227 (R;US)

Microemulsion Flooding
Detailed evaluation of the West Kiehl alkaline-surfactant-polymer field project and it's application to mature Minnelusa waterfloods. Technical progress report, July–September, 1994, 20:7203 (R;US)

Miscible-Phase Displacement
Research program on fractured petroleum reservoirs. Quarterly progress report, July 1–September 30, 1994, 20:7206 (R;US)

Productivity
Secondary oil recovery from selected Carter sandstone oilfields–Black Warrior Basin, Alabama. Final report, 20:7214 (R;US)

Sweep Efficiency
Gypsy Field project in reservoir characterization. Quarterly progress report, May 19–September 30, 1994, 20:7193 (R;US)

Waste Water
Development of a cost effective environment compliance technology for stripper brine wells. Quarterly report, July 1, 1994–September 30, 1994, 20:7239 (R;US)

Waterflooding
An experimental and theoretical study to relate uncommon rock/fluid properties to oil recovery. Quarterly report, October 1, 1993–December 31, 1993, 20:7190 (R;US)
Detailed evaluation of the West Kiehl alkaline-surfactant-polymer field project and it's application to mature Minnelusa

waterfloods. Technical progress report, July–September, 1994, 20:7203 (R;US)
Green River Formation water flood demonstration project, Uinta Basin, Utah. Quarterly technical progress report, July 1–September 30, 1994, 20:7216 (R;US)
Improved recovery demonstration for Williston Basin carbonates. Quarterly report, June 1–September 30, 1994, 20:7223 (R;US)
Integrated approach towards the application of horizontal wells to improve waterflooding performance. Quarterly technical progress report, July 1–September 30, 1994, 20:7213 (R;US)
Research program on fractured petroleum reservoirs. Quarterly progress report, July 1–September 30, 1994, 20:7206 (R;US)
Secondary oil recovery from selected Carter sandstone oilfields–Black Warrior Basin, Alabama. Final report, 20:7214 (R;US)
Surfactant loss control in chemical flooding: Spectroscopic and calorimetric study of adsorption and precipitation on reservoir minerals. Quarterly technical progress report, July 1, 1994–October 31, 1994, 20:7211 (R;US)

Well Logging
Recovery of bypassed oil in the Dundee Formation using horizontal drains. Quarterly report, 4th quarter, FY 1994, 20:7222 (R;US)

OKLAHOMA
Gypsy Field project in reservoir characterization. Quarterly progress report, May 19–September 30, 1994, 20:7193 (R;US)

OMEGA BARYONS
Baryon spectroscopy and the omega minus, 20:8824 (R;US)

OMEGA-1778 RESONANCES
See MESONS

OMEGA-783 MESONS
Mixing phases of unstable two-level systems, 20:8847 (R;RU)

OMEGA-784 RESONANCES
See OMEGA-783 MESONS

ON-LINE COMPUTERS
See COMPUTERS
ON-LINE SYSTEMS

ON-LINE CONTROL SYSTEMS
See also COMPUTERIZED CONTROL SYSTEMS
Automatized working place of the microtron MT-25 operator, 20:8321 (IA;RU;In Russian)

ON-LINE MEASUREMENT SYSTEMS
New informative techniques in high energy physics, 20:9164 (R;RU;In Russian)

ON-LINE SYSTEMS
See also ON-LINE CONTROL SYSTEMS
ON-LINE MEASUREMENT SYSTEMS
Using knowledge based systems for rams analysis and on-line operator support of nuclear power plants, 20:7740 (RA;XA)

OPERATION (REACTOR)
See REACTOR OPERATION

OPERATIONS RESEARCH
Leadership – It's everybody's business, 20:9150 (R;US)

OPIX PROCESS
See RADIOACTIVE WASTE PROCESSING

OPTICAL FIBERS
Applications of optical fiber to the remote fluorescence analysis, 20:8388 (R;KR;In Korean)
Reduction in fiber damage thresholds due to static ˢatigue, 20:8131 (R;US)

OPTICAL FILTERS
Transient radiation-induced absorption in materials for the DOI laser, 20:8278 (R;US)

OPTICAL MODELS
Optical model parameters and fast neutron small angles scattering cross sections, 20:8898 (RA;CN)

OPTICAL SYSTEMS
High-performance GaAs/AlGaAs optical modulators: Their performance and packaging for microwave photonic integrated circuits, 20:8277 (R;US)
X-ray photoelectron spectroscopy analysis of cleaning procedures for synchrotron radiation beamline materials at the Advanced Photon Source, 20:8332 (R;US)

ORANGE EVENT
See NUCLEAR EXPLOSIONS

ORE PROCESSING
Addressing the environmental burden remained after uranium surveying, mining and milling, 20:7448 (IA;CZ;In Czech)

ORGANIC COMPOUNDS
See also AROMATICS
CARBOHYDRATES
HYDROCARBONS
NUCLEIC ACIDS
ORGANIC POLYMERS
ORGANIC SILICON COMPOUNDS
ORGANIC SULFUR COMPOUNDS
PROTEINS
F-Area Acid/Caustic Basin groundwater monitoring report: Third quarter 1994, 20:8520 (R;US)
Metallurgical Laboratory Hazardous Waste Management Facility groundwater monitoring report. Third quarter, 1994, 20:7463 (R;US)
Nonlinear optics and organic materials, 20:8705 (R;US)
Organic destruction to enhance the separation of strontium in radioactive wastes, 20:7351 (R;US)
Passive control of VOCs using valved well heads: FY1994 report, 20:7508 (R;US)
Soil pore-gas sampling by photoacoustic radiometry, 20:7324 (R;US)
Toxic volatile organic compounds in environmental tobacco smoke: Emission factors for modeling exposures of California populations, 20:8461 (R;US)

ORGANIC ION EXCHANGERS
Radiolytic Hydrogen Production During the Long Term Storage of Spent Organic Ion Exchange Resins, 20:7430 (R;US)

ORGANIC POLYMERS
See also COPOLYMERS
POLYESTERS
RESINS
Improving reservoir conformance using gelled polymer systems. Quarterly progress report, July 1–September 30, 1994, 20:7207 (R;US)
Microporous polyimide films for reduced dielectric applications, 20:8148 (R;US)
Quantitation of microbial products and their effectiveness in enhanced oil recovery. Final report, 20:7199 (R;US)

ORGANIC SILICON COMPOUNDS
Disilene Addition to C_{70}, 20:8193 (R;US)

ORGANIC SOLVENTS
Demonstration testing and evaluation of in situ soil heating. Health and safety plan (Revision 2), 20:7302 (R;US)
Demonstration testing and evaluation of in situ soil heating. Treatability study work plan (Revision 2), 20:7301 (R;US)
The evaluation of potential limonene scavengers, 20:8466 (R;US)

ORGANIC SULFUR COMPOUNDS
Molecular biological enhancement of coal desulfurization. Final report, 20:7114 (R;US)
Organosulphur compounds in coals as determined by reaction with Raney nickel and microscale pyrolysis techniques. First quarterly report, July 1, 1994–September 30, 1994, 20:7149 (R;US)

ORGANIC WASTES
Review of research results for the photocatalytic oxidation of hazardous wastes in air, 20:8462 (R;US)

ORGDP
Bench-scale treatability studies for simulated incinerator scrubber blowdown containing radioactive cesium and strontium, 20:7335 (R;US)

ORNL
Alternative futures for the Department of Energy National Laboratories, 20:7881 (R;US)
Data summary for the near-shore sediment characterization task of the Clinch River Environmental Restoration Program, 20:7483 (R;US)
Design assessment for Melton Valley liquid low-level waste collection and transfer system upgrade project at Oak Ridge National Laboratory, Oak Ridge, Tennessee, 20:7297 (R;US)
Design demonstrations for category B tank systems at Oak Ridge National Laboratory, Oak Ridge, Tennessee, 20:7300 (R;US)

Design/installation and structural integrity assessment under the Federal Facility Agreement for Bethel Valley low-level waste collection and transfer system upgrade for Building 2026 (High Radiation Level Analytical Laboratory) and Building 2099 (Monitoring and Control Station) at Oak Ridge National Laboratory, 20:7299 (R;US)

Oak Ridge National Laboratory Core Competencies, 20:7876 (R;US)

Selection of liquid-level monitoring method for the Oak Ridge National Laboratory inactive liquid low-level waste tanks, remedial investigation/feasibility study, 20:7333 (R;US)

Technical Support Section annual work plan for FY 1995, 20:9149 (R;US)

Technology study of Gunite tank sludge mobilization at Oak Ridge National Laboratory, Oak Ridge, Tennessee, 20:7484 (R;US)

Third annual environmental restoration monitoring and assessment report for FY 1994 of the Oak Ridge National Laboratory, Oak Ridge, Tennessee, 20:7471 (R;US)

OSCILLATIONS (PLASMA)
See PLASMA WAVES

OSMIUM 190
Study on the (γ, γ') reactions with population of high spin ^{180m}Hf, ^{190m}Os and ^{204m}Pb isomers, 20:8920 (IA;RU;In Russian)

OVENS
Aerogels - a foam alternative, 20:7991 (RA;US)

OXETANE
See ETHERS

OXIMES
Study on the extraction of Am^{3+} and rare earth elements with β-oxime extractant (7804) (I), 20:8153 (R;CN;In Chinese)

OXOPROPANE
See ACETONE

OXYGEN
Analysis of the composition of ion-beam irradiated elastomer using the Rutherford back scattering, 20:8166 (IA;RU;In Russian)

Power oscillator in the Tokamaks training., 20:9053 (I;MX;In Spanish)

The effect of O_2 intercalation on the rotational dynamics and the ordering transition of C_{60}, 20:8175 (R;US)

The evaluation of oxygen complete neutron data for CENDL-2, 20:8882 (RA;CN)

OXYGEN 16 REACTIONS
Negative binomial fits to multiplicity distributions from central collisions of ^{16}O + Cu at 14.6A GeV/c and intermittency, 20:8880 (R;US)

OXYGEN 16 TARGET
Cascades of Nuclear Interactions in Liquid Hydrogen, 20:8924 (R;XJ)

Measurement of de-excitation γ-rays following the photodisintegration of ^{16}O: a test of the quasi-deuteron model in photonuclear reactions above the GDR, 20:8940 (R;AU)

OXYGEN EFFECT (RADIOBIOLOGY)
See OXYGEN

OXYGEN HYDRIDES
See WATER

OZONE LAYER
Development of ultrasensitive spectroscopic analysis technology -Development of atomic spectroscopy technology-, 20:8988 (R;KR;In Korean)

1,2,3-PROPANETRIOL
See GLYCEROL

1-PROPANOL
See PROPANOLS

P

PACIFIC GAS DIABLO CANYON-1 REACTOR
See DIABLO CANYON-1 REACTOR

PACIFIC GAS DIABLO CANYON-2 REACTOR
See DIABLO CANYON-2 REACTOR

PACIFIC NORTHWEST LABORATORIES
See BATTELLE PACIFIC NORTHWEST LABORATORIES

PACIFIC NORTHWEST REGION
See USA

PAKISTAN ATOMIC RESEARCH REACTOR
See PARR REACTOR

PALLADIUM
Heterogeneous catalytic process for alcohol fuels from syngas. Tenth quarterly technical progress report, April 1994–June 1994, 20:7566 (R;US)

Layer-by-layer analysis of chemical composition at the interface of Fe-Pd structure irradiated with Xe^+ ions, 20:8093 (IA;RU;In Russian)

PALLADIUM NITRATES
See NITRATES

PANINDCO PROCESS
See COAL GASIFICATION

PANTEX PLANT
Environmental report for Pantex Plant, 1993, 20:7442 (R;US)

PAPER
An experimental and theoretical study of multi-cylinder paper drying, 20:8028 (R;SE)

PARAFFINS
See ALKANES

PARALLEL PROCESSING
A domain decomposition study of massively parallel computing in compressible gas dynamics, 20:8255 (R;US)

Energy and Technology Review, 20:9129 (R;US)

Implementation of a parallel algorithm for thermo-chemical nonequilibrium flow simulations, 20:8256 (R;US)

Scalable, extensible, and portable numerical libraries, 20:9153 (R;US)

Technology and applications, 20:9173 (R;HU)

PARAMAGNETIC RESONANCE (ELECTRON)
See ELECTRON SPIN RESONANCE

PARASTATISTICS
Generalized deformed para-Bose oscillator and its coherent states, 20:8695 (R;XA)

PARR REACTOR
Contributions of research Reactors in science and technology, 20:7779 (R;PK)

Delayed neutron monitoring system for fuel failure detection at PARR-1, 20:7775 (R;PK)

Neutronic analysis for upgradation of Pakistan Research Reactor-1 from 9 to 10 MW, 20:7776 (R;PK)

Radiological consequence analysis for upgradation of Pakistan Research Reactor-1 from 9 to 10 MW, 20:7758 (R;PK)

Thermal hydraulic analysis for upgradation of Pakistan Research Reactor-1 from 9 to 10 MW, 20:7777 (R;PK)

PARTIAL DIFFERENTIAL EQUATIONS
See also BOLTZMANN-VLASOV EQUATION
NAVIER-STOKES EQUATIONS

Maximum principle for subsolutions of degenerate elliptic operators, 20:8668 (R;XA)

Scalable, extensible, and portable numerical libraries, 20:9153 (R;US)

The geometry of weak solutions of certain integrable nonlinar PDE's, 20:9178 (R;US)

PARTICLE BEAMS
Interferometry with particles of non-zero rest mass: topological experiments, 20:8684 (R;AU)

Inverse Cerenkov LPA experiments. 1986 Annual report, 20:8285 (R;US)

The cooling of particle beams, 20:8305 (R;US)

PARTICLE IDENTIFICATION
Study of $b\bar{b}$ production in e^+e^- annihilation at $\sqrt{s}$ = 29 GeV with the aid of neural networks, 20:8803 (R;US)

PARTICLE KINEMATICS
Multi-particle correlations in quaternionic quantum systems, 20:8707 (R;AU)

PARTICLES
See also PARTICULATES

Characterization of soot particles by in situ measurement with different aerosol analysis tools, 20:8477 (RA;FI)

Continuous method for coal fired power plant particle emission mass monitoring, 20:7637 (RA;FI)

Particle emissions from pressurized fluidized bed combustion, 20:7183 (RA;FI)
Particle-turbulence interaction in dilute suspensions, 20:8259 (R;FI)
Shock compression and expansion in central collisions, 20:8908 (R;US)

PARTICULATES
A study on the multi-stage combustion in incinerator with low pollution, 20:8267 (R;KR;In Korean)
Development of CCS application technology in industries (II), 20:7188 (R;KR;In Korean)
Electrostatic precipitator penetration function for pulverised coal combustion aerosols at different boiler loadings, 20:7150 (RA;FI)
On the detection efficiency of ultrafine CNC at 1-3 nm size range, 20:8446 (RA;FI)

PARTONS
A search for jet handedness in hadronic Z^0 decays, 20:8805 (R;US)
A search for jet handedness in hadronic Z^0 decays, 20:8814 (R;US)

PATGAS PROCESS
See COAL GASIFICATION

PBX DEVICES
Active core profile and transport modification by application of Ion Bernstein Wave power in PBX-M, 20:9076 (R;US)
Formation of core transport barrier and CH-Mode by ion Bernstein wave heating in PBX-M, 20:9086 (R;US)
Role of MHD activity in LH-assisted discharges in the PBX-M tokamak, 20:9083 (R;US)

PCR
See POLYMERASE CHAIN REACTION

PDU
See PROCESS DEVELOPMENT UNITS

PEAT
Particle emissions from pressurized fluidized bed combustion, 20:7183 (RA;FI)
Research projects in 1994, 20:7541 (R;FI;In Finnish, English)

PEATLANDS
See WETLANDS

PELLETS (FUEL)
See FUEL PELLETS

PENETROMETERS
Innovative directional and position specific sampling technique. Phase 3: Final report, July 1992–September 1994, 20:8416 (R;US)

PENNING ION SOURCES
Spectroscopic measurements of plasma parameters of plan-otron and Penning H^- ion source discharges, 20:8685 (R;RU;In Russian)

PEOPLE
See HUMAN POPULATIONS

PEOPLES REPUBLIC OF CHINA
See CHINA

PEP STORAGE RINGS
Photon stimulated desorption (PSD) measurements of extruded copper and of welded copper beam chambers for the PEP II asymmetric B-factory, 20:8333 (R;US)

PEPPERS
The application of irradiation techniques for food preservation and process improvement -Studies on application of radiation and radioisotopes-, 20:8605 (R;KR;In Korean)

PERMEABILITY COEFFICIENT (FLUID MECHANICS)
See HYDRAULIC CONDUCTIVITY

PERMUTIT (ORGANIC)
See ORGANIC ION EXCHANGERS

PERSONAL COMPUTERS
Efficiency evaluation and plan for extensive use of newly developed energy saving products- OA equipment energy saver and vehicle fuel economizer, 20:7977 (R;KR;In Korean)

PERSONNEL
See also CRAFTSMEN
REACTOR OPERATORS
Energy and Technology Review, 20:9129 (R;US)
Leadership – It's everybody's business, 20:9150 (R;US)
Project management plan, Hazardous Materials Management and Emergency Response Training Center, 20:7498 (R;US)

PERSONNEL DOSIMETRY
Intercomparison of high energy neutron personnel dosimeters, 20:8395 (R;US)

PERSONNEL FILM DOSIMETRY
See PERSONNEL DOSIMETRY

PERSONNEL MONITORING
A computerized data-base system foe personal internal contamination results, 20:9190 (RA;IL)

PETROCHEMICAL FEEDSTOCKS
See CHEMICAL FEEDSTOCKS

PETROLEUM
See also PETROLEUM FRACTIONS
A model technology transfer program for independent operators: Kansas Technology Transfer Model (KTTM), 20:7202 (R;US)
Documentation of the petroleum market model (PMM). Appendix: Model developer's report, 20:7236 (R;US)
Energy and Technology Review, 20:9129 (R;US)
International petroleum statistics report, 20:7234 (R;US)
Petroleum marketing annual 1993, 20:7233 (R;US)
Petroleum marketing monthly: January 1995, with data for October 1994, 20:7232 (R;US)
Surfactant loss control in chemical flooding: Spectroscopic and calorimetric study of adsorption and precipitation on reservoir minerals. Quarterly technical progress report, April 1, 1994–June 30, 1994, 20:7210 (R;US)
The perspectives of Norwegian petroleum resources, 20:7194 (R;NO)
Winter fuels report. Week ending: January 20, 1995, 20:7885 (R;US)

PETROLEUM COKE
See PETROLEUM PRODUCTS

PETROLEUM COOPERATIVES
See PETROLEUM INDUSTRY

PETROLEUM DEPOSITS
See also OIL FIELDS
Application of reservoir characterization and advanced technology to improve recovery and economic in a lower quality shallow shelf carbonate reservoir. Third quarter 1994, August 3, 1994–September 30, 1994, 20:7225 (R;US)
Assist in the recovery of bypassed oil from reservoirs in the Gulf of Mexico. Quarterly status report (final), July 1–September 30, 1994, 20:7201 (R;US)
Gypsy Field project in reservoir characterization. Quarterly progress report, May 19–September 30, 1994, 20:7193 (R;US)
Horizontal oil well applications and oil recovery assessment. Technical progress report-final, July 1994–September 1994, 20:7204 (R;US)
Improved efficiency of miscible CO_2 floods and enhanced prospects for CO_2 flooding heterogeneous reservoirs. Quarterly technical progress report, April 14, 1994–June 30, 1994, 20:7220 (R;US)
Improved efficiency of miscible CO_2 floods and enhanced prospects for CO_2 flooding heterogeneous reservoirs. Quarterly technical progress report, July 1, 1994–September 30, 1994, 20:7221 (R;US)
Improved recovery demonstration for Williston Basin carbonates. Quarterly report, June 1–September 30, 1994, 20:7223 (R;US)
Integration of advanced geoscience and engineering techniques to quantify inter-well heterogeneity. Quarterly technical report, July 1, 1994–September 30, 1994, 20:7191 (R;US)
Interdisciplinary study of reservoir compartments. Quarterly technical progress report, July 1, 1994–September 30, 1994, 20:7212 (R;US)
Models of natural fracture connectivity – Implications for reservoir permeability. Final report, 20:8649 (R;US)

PETROLEUM FRACTIONS
See also PETROLEUM RESIDUES
Improvement of hydrogen solubility and entrainment in hydrocracker feedstocks. Quarterly technical report, July 1, 1994–September 30, 1994, 20:7228 (R;US)

The selective catalytic cracking of Fischer-Tropsch liquids to high value transportation fuels. Quarterly technical status report for first quarter fiscal year, 1994 - report No. 41, October 1, 1993–December 31, 1993, 20:7230 (R;US)
The selective catalytic cracking of Fischer-Tropsch liquids to high value transportation fuels. Quarterly technical progress report No. 5, first quarter fiscal year 1993, October 1, 1992–December 31, 1992, 20:7229 (R;US)

PETROLEUM INDUSTRY
Experience gained in the lightning protection of aircraft and petrochemical installations applicable to wind turbine generators, 20:8239 (RA;DK)
International petroleum statistics report, 20:7234 (R;US)
Petroleum marketing annual 1993, 20:7233 (R;US)

PETROLEUM PRODUCTS
See also FUEL OILS
GASOLINE
Effect of pretreating of host oil on coprocessing. Quarterly progress report, July 1–September 30, 1994, 20:7128 (R;US)
Petroleum marketing monthly: January 1995, with data for October 1994, 20:7232 (R;US)

PETROLEUM REFINERIES
New nanophase iron-based catalysts for hydrocracking applications, 20:7231 (R;US)

PETROLEUM RESIDUES
Bench-scale development of coal/oil co-processing technology. Twelfth quarterly report, 1 July–30 September 1990, 20:7110 (R;US)
The role of the resid solvent in coprocessing with finely divided catalysts. Quarterly report, July–September, 1994, 20:7129 (R;US)

PHASE CHANGE MATERIALS
Development of advanced low-temperature heat transfer fluids for district heating and cooling, final report, 20:8249 (R;US)

PHASE DIAGRAMS
Ordered compounds under irradiation: dynamical equilibrium phase diagrams and microstructural evolutions, 20:8074 (R;FR;In French)

PHASE TRANSFORMATIONS
See also CRYSTAL-PHASE TRANSFORMATIONS
Statistical mechanics of nonlinear coherent structures: Kinks in the Φ^6 model, 20:8704 (R;US)

PHOSPHORS
See also INORGANIC PHOSPHORS
Scintillator Based on SiO_2-Aerogel, 20:8386 (R;XJ;In Russian)

PHOSPHORUS 31
The evaluation of ^{31}P complete data for CENDL-2, 20:8884 (RA;CN)

PHOTOCHEMICAL REACTIONS
See also PHOTOLYSIS
PHOTOSYNTHESIS
Parallel processing of atmospheric chemistry calculations: Preliminary considerations, 20:8458 (R;US)
Photochemical reactions of $CuInSe_2$ thin films in sulphuric acid solution., 20:8201 (IA;MX)
Solar photochemistry - twenty years of progress, what's been accomplished, and where does it lead?, 20:7585 (R;US)

PHOTODISINTEGRATION
See PHOTONUCLEAR REACTIONS

PHOTOELECTROMAGNETIC EFFECT
See MAGNETIC FIELDS

PHOTOFISSION
Cross section of the californium 249 photofission, 20:8919 (IA;RU;In Russian)
Microtron MT-25. Workshop on application of microtrons in nuclear physics, 20:8288 (I;RU;In Russian)

PHOTOLYSIS
Overview of solar detoxification activities in the United States, 20:8463 (R;US)

PHOTOMAGNETOELECTRIC EFFECT
See MAGNETIC FIELDS

PHOTON ACTIVATION ANALYSIS
Microtron MT-25. Workshop on application of microtrons in nuclear physics, 20:8288 (I;RU;In Russian)

PHOTON TRANSPORT
Results of the MCNP analysis of 20/20 LEU fuel for the Oregon State University TRIGA Reactor, 20:7765 (R;US)

PHOTONS
Interferometry of hard photons in heavy-ion collisions, 20:8829 (R;FR;In French)
Photon-charm production in $p\bar{p}$ collisions at $\sqrt{s}$ = 1.8 TeV, 20:8786 (R;US)
The search for the decay of Z boson into two gamma as a test of Bose statistics, 20:8822 (R;AU)

PHOTONUCLEAR REACTIONS
See also PHOTOFISSION
Microtron MT-25. Workshop on application of microtrons in nuclear physics, 20:8288 (I;RU;In Russian)
Photonuclear reactions of complex nuclei at intermediate energies., 20:8912 (IA;MX)
Study on the (γ, γ') reactions with population of high spin ^{180m}Hf, ^{190m}Os and ^{204m}Pb isomers, 20:8920 (IA;RU;In Russian)
Study on the photonuclear reactions with alpha particles and cluster emission in the region of giant dipole resonance, 20:8922 (IA;RU;In Russian)

PHOTOSYNTHESIS
The development of a generic model for assessing the effects of elevated CO_2 on ecosystems. Progress report, September 1, 1987–May 31, 1988, 20:8569 (R;US)
[Generic ecosystem model for assessing the effects of elevated carbon dioxide on ecosystems]. [Annual] report, July 1, 1988–June 30, 1989, 20:8570 (R;US)

PHOTOVOLTAIC CELLS
See also SOLAR CELLS
Amorphous silicon photovoltaic manufacturing technology - Phase 2A. Annual subcontract report, May 1, 1993–April 30, 1994, 20:7583 (R;US)
Crystalline-silicon photovoltaics: Necessary and sufficient, 20:7589 (R;US)
Recent progress in the Photovoltaic Manufacturing Technology Project (PVMaT), 20:7596 (R;US)

PHOTOVOLTAIC POWER SUPPLIES
Environmental impact statements in research projects. The example of photovoltaic energy conversion. Vol. 1. Summary and results, 20:7597 (R;DE;In German)

PHTHALATES
Phthalates in Swedish sediments, 20:8541 (R;SE)

PHWR TYPE REACTORS
Development of advanced CANDU PHWR -Development of the advanced CANDU technology-, 20:7673 (R;KR;In Korean)

PHYSICS
See also HIGH ENERGY PHYSICS
NUCLEAR PHYSICS
Abstracts of annual physics conference of Iran 1373, Kordestan University, Sanandaj, 19 Aug - 1 Sep 1994, 20:8655 (I;IR;In English, Persian)
SciTech Clubs for Girls. [Final report], September 1, 1991–April 30, 1994, 20:8654 (R;US)

PI-1016 RESONANCES
See MESONS

PIEZOMETRY
Environmental isotopic study of the "Grand Yaere" aquifers (North-Cameroon), 20:8484 (RA;XA;In French)
Importance of evaporation processes in the formation of the piezometric depression in Sahelian region: Hypothesis and modelling, 20:8480 (RA;XA;In French)

PIG ION SOURCES
See PENNING ION SOURCES

PIGE ANALYSIS
See PROTON REACTIONS

PILOT PLANTS
See also WIPP
Pilot gasification and hot gas cleanup operations, 20:7108 (R;US)

PIN STRIPE EVENT
See NUCLEAR EXPLOSIONS
UNDERGROUND EXPLOSIONS

PION-NUCLEON INTERACTIONS
The evaluation of specific types of integrals involving confluent hypergeometric functions, 20:8943 (R;AU)

PIONS
See also PIONS MINUS
PIONS NEUTRAL
Electromagnetic production of pions on the nucleon, 20:8778 (R;US)

PIONS MINUS
Pion Momentum Spectra in Nuclear Charge Exchange Reactions A(t, ^{3} He), 20:8928 (R;XJ)

PIONS NEUTRAL
Inclusive π^0 Production in pC and pCu Interactions at 4,5 GeV/c, 20:8936 (R;XJ;In Russian)
The off-shell axial anomaly via the $\gamma^*\pi^0 \rightarrow \gamma$ transition, 20:8826 (R;US)

PIPELINES
Computer assisted diagnostic pig system for preventive damage detection in pipelines, 20:7243 (I;DE;In German)
Design assessment for Melton Valley liquid low-level waste collection and transfer system upgrade project at Oak Ridge National Laboratory, Oak Ridge, Tennessee, 20:7297 (R;US)
EVOPE - Evaluation of polyethylene pipes for gas distribution. Final report, 20:7256 (R;SE;In Swedish)
Final joint environmental assessment for the construction and routine operation of a 12-kilovolt (KV) overhead powerline right-of-way, and formal authorization for a 10-inch and 8-inch fresh water pipeline right-of-way, Naval Petroleum Reserve No. 1, Kern County, California, 20:7824 (R;US)
Geophysical investigation of 216-U-8 clay vitrified pipe transfer line, 200 West Area, 20:7456 (R;US)
Pipeline corridors through wetlands - impact on plant communities: Mill Creek Tributary Crossing, Jefferson County, New York, 1991 survey. Topical report, June 1991–April 1993, 20:7252 (R;US)
Pipeline corridors through wetlands – Impacts on plant communities: Little Timber Creek Crossing, Gloucester County, New Jersey. Topical report, August 1991–January 1993, 20:7253 (R;US)
Pipeline corridors through wetlands – Impacts on plant communities: Norris Brook Crossing Peabody, Massachusetts, 20:7254 (R;US)
Relining of pipelines for natural gas distribution (Swage-lining), 20:8265 (R;SE;In Swedish)
Structural reliability methods for pipeline design and code calibration, 20:7245 (R;NO)
The Energy Information Administration's assessment of reformulated gasoline: An update, 20:7238 (R;US)

PIPES
The MBB-Vacuum Super Insulation (VSI), 20:7989 (RA;US)

PISTONS
Advanced Diesel Engine Component Development Program, final report - tasks 4-14, 20:8056 (R;US)

PIXE ANALYSIS
New insight into proton-induced latchup. Experiments and modelling, 20:8404 (RA;IL)
PIXE analysis setup using a proton in air beam facility at the ININ., 20:8156 (IA;MX)
PIXE analysis setup using a proton in air beam facility at the ININ., 20:8315 (IA;MX)

PLANT BREEDING
Studies on the radiation application for the development of genetic resources -Studies on application of radiation and radioisotopes-, 20:8624 (R;KR;In Korean)

PLANT GROWTH
The photosynthetic acclimation of Lolium perenne growing in a free-air CO_2 enrichment (FACE) system, 20:8585 (R;US)

PLANT TISSUES
Studies on the radiation application for the development of genetic resources -Studies on application of radiation and radioisotopes-, 20:8624 (R;KR;In Korean)

PLANTS
See also MEDICINAL PLANTS
Controls over nutrient flow through plants and microbes in Arctic tundra. Final technical report, 20:8586 (R;US)
Fall 1994 wildlife and vegetation survey, Norton Air Force Base, California, 20:8511 (R;US)
Pipeline corridors through wetlands - impact on plant communities: Mill Creek Tributary Crossing, Jefferson County, New York, 1991 survey. Topical report, June 1991–April 1993, 20:7252 (R;US)
Pipeline corridors through wetlands – Impacts on plant communities: Little Timber Creek Crossing, Gloucester County, New Jersey. Topical report, August 1991–January 1993, 20:7253 (R;US)
Toxicological benchmarks for screening potential contaminants of concern for effects on terrestrial plants: 1994 revision, 20:8640 (R;US)

PLANTS (PILOT)
See PILOT PLANTS

PLANTS (POWER)
See POWER PLANTS

PLASMA
See also HIGH-BETA PLASMA
ROTATING PLASMA
Adiabatic pair potential for charged particulates in plasma and electrolytes, 20:8692 (RA;IL)
Analysis of relativistic free electron wave generator by plasma electrodynamics, 20:9051 (IA;IR;In English, Persian)
Experimental constraints on transport, 20:9048 (R;US)
Onsager-molecule approach to screening potentials in strongly coupled plasmas, 20:8691 (RA;IL)

PLASMA DIAGNOSTICS
Alfven eigenmodes active excitation experiments in JET, 20:9073 (RA;CH)
Design studies for ITER x-ray diagnostics, 20:9082 (R;US)
Determination of electric and magnetic fields in open trap plasmas by means of atomic-molecular beam hydrogen isotopes, 20:9059 (R;RU;In Russian)
Development of plasma diagnostics technologies -A study on nuclear fusion reactor-, 20:9068 (R;KR;In Korean)
Papers presented at the 15. international conference on plasma physics and controlled nuclear fusion research, 20:9071 (R;CH)

PLASMA FILAMENT
HF-stabilization of plasma with sharp boundary, 20:9066 (R;RU;In Russian)

PLASMA IMPURITIES
Study of impurity concentrations by VUV spectroscopy on HL-1, 20:9043 (R;CN)

PLASMA INSTABILITY
Completing a plant to simulate the plasma/wall interaction in a fusion reactor. Final report, 20:9103 (R;DE;In German)
Evidence for modified transport due to sheared E x B flows in high-temperature plasmas, 20:9049 (R;US)
Wall stabilization of ideal modes in tokamaks, 20:9074 (RA;CH)

PLASMA OSCILLATIONS
See PLASMA WAVES

PLASMA PRODUCTION
X-ray laser studies using plasmas created by optical field ionization, 20:9084 (R;US)

PLASMA WAVES
Bernstein-Green-Kruskal wave, 20:9056 (R;RU;In Russian)
Bernstein-Green-Kruskal wave. 2. The interaction with the Langmuir wave. Stochastic phenomena, 20:9057 (R;RU;In Russian)
Conversion of the Bernstein-Green-Kruskal wave on the density perturbation. Part 1, 20:9061 (R;RU;In Russian)
Conversion of the Bernstein-Green-Kruskal wave on the density perturbation. Part 4, 20:9064 (R;RU;In Russian)
Conversion of the Bernstein-Green-Kruskal wave on the density perturbation. Part 1, 20:9061 (R;RU;In Russian)
Conversion of the Bernstein-Green-Kruskal wave on the density perturbation. Part 2, 20:9062 (R;RU;In Russian)
Conversion of the Bernstein-Green-Kruskal wave on the density perturbation. Part 3, 20:9063 (R;RU;In Russian)
Conversion of the Bernstein-Green-Kruskal wave on the density perturbation. Part 2, 20:9062 (R;RU;In Russian)

Conversion of the Bernstein-Green-Kruskal wave on the density perturbation. Part 4, 20:9064 (R;RU;In Russian)
Hot-ion Bernstein wave with large $k_{parallel}$, 20:9080 (R;US)

PLATES (FUEL)
See FUEL PLATES

PLATINUM
Generation, detection and characterization of gas-phase transition metal aggregates and compounds. Final technical report, September 15, 1991–July 14, 1994, 20:8181 (R;US)
Search for strangelets and other rare objects in Au + Pt collisions at the AGS using a fixed-angle focusing spectrometer, 20:8879 (R;US)

PLATINUM BASE ALLOYS
A study of the electrochemical behavior in tungsten and caustic solutions and platinum/iridium in chloride solutions, informal report, 20:8072 (R;US)

PLUGGING AGENTS
Polysaccharides and bacterial plugging. Final report, 1992–1993, 20:7200 (R;US)
Quantitation of microbial products and their effectiveness in enhanced oil recovery. Final report, 20:7199 (R;US)

PLUMES
Atmospheric dispersion estimates in the vicinity of buildings, 20:7760 (R;US)
Development of computing code system for level 3 PSA -A study for nuclear safety improvement-, 20:7756 (R;KR;In Korean)
Soil pore-gas sampling by photoacoustic radiometry, 20:7324 (R;US)

PLUTONIUM

Accounting
Material unaccounted for at the Southwest Experimental Fast Oxide Reactor: The SEFOR MUF, 20:7764 (R;US)

Compatibility
Hydrolysis of plutonium: Corrosion kinetics in DMSO solutions containing simulated high explosive and water, 20:8421 (R;US)

Diagrams
Application of the species existence-predominance and distribution diagrams to the plutonium and americium electrodeposition., 20:8215 (IA;MX)

Environmental Transport
Direct measurements of transport properties are essential for site characterization, 20:7452 (R;US)

Fabrication
Plutonium production and storage at BNFL Sellafield, United Kingdom, 20:7277 (RA;XA)

Hydrolysis
Hydrolysis of plutonium: Corrosion kinetics in DMSO solutions containing simulated high explosive and water, 20:8421 (R;US)

International Cooperation
Safe handling, transport and storage of plutonium. Proceedings of a technical committee meeting held in Vienna, 18-21 October 1993, 20:7702 (R;XA)

Materials Handling
French engineering design rules for safe handling and storage of plutonium, 20:7279 (RA;XA)
HM nuclear installation inspectorate's experience of the regulatory control of the storage, handling and transport of civil plutonium in the United Kingdom, 20:7513 (RA;XA)

Meetings
Safe handling, transport and storage of plutonium. Proceedings of a technical committee meeting held in Vienna, 18-21 October 1993, 20:7702 (R;XA)

Packaging
Safety of plutonium shipments in and from France, 20:7280 (RA;XA)

Plutonium Recycle
Problems concerning the accumulation of isolated plutonium - The Swiss situation, 20:7273 (RA;XA)

Radiation Monitoring
Alpha spectral analysis via artificial neural networks, 20:7453 (R;US)

Reprocessing
Problems concerning the accumulation of separated plutonium. Report of an advisory group meeting held in Vienna, 26-29 April 1993, 20:7265 (R;XA)

Safety
Safe handling, transport and storage of plutonium. Proceedings of a technical committee meeting held in Vienna, 18-21 October 1993, 20:7702 (R;XA)
Safety principles for plutonium facilities in France, 20:7786 (RA;XA)

Spent Fuel Storage
Problems concerning the accumulation of isolated plutonium - The Swiss situation, 20:7273 (RA;XA)
Problems concerning the accumulation of separated plutonium. Report of an advisory group meeting held in Vienna, 26-29 April 1993, 20:7265 (R;XA)

Spent Fuels
China's nuclear power programme and the projected production and consumption of plutonium, 20:7266 (RA;XA)
Industrial reprocessing and recycling in France: An effective plutonium management method, 20:7267 (RA;XA)

Storage
HM nuclear installation inspectorate's experience of the regulatory control of the storage, handling and transport of civil plutonium in the United Kingdom, 20:7513 (RA;XA)
Plutonium production and storage at BNFL Sellafield, United Kingdom, 20:7277 (RA;XA)

Transport
HM nuclear installation inspectorate's experience of the regulatory control of the storage, handling and transport of civil plutonium in the United Kingdom, 20:7513 (RA;XA)
Plutonium transport: The UK experience - 35 years on, 20:7281 (RA;XA)
Safety of plutonium shipments in and from France, 20:7280 (RA;XA)

Transport Regulations
Plutonium transport: The UK experience - 35 years on, 20:7281 (RA;XA)
Safety of plutonium shipments in and from France, 20:7280 (RA;XA)

PLUTONIUM 239
Evaluation of neutron nuclear data of ^{239}Pu for CENDL-2, 20:8891 (RA;CN)
Neutron scattering studies in the actinide region. Progress report, August 1, 1991–July 31, 1994, 20:8906 (R;US)

PLUTONIUM 239 TARGET
Neutron scattering studies in the actinide region. Progress report, August 1, 1991–July 31, 1994, 20:8906 (R;US)

PLUTONIUM 240
Evaluation of neutron nuclear data for ^{240}Pu, 20:8892 (RA;CN)

PLUTONIUM OXIDES
Criticality safety evaluation report for the 100 KE Basin sandfilter backwash pit, 20:7375 (R;US)

PNL
See BATTELLE PACIFIC NORTHWEST LABORATORIES

POISONS (CHEMICAL)
See HAZARDOUS MATERIALS

POKHRAN EVENT
See CONTAINED EXPLOSIONS
NUCLEAR EXPLOSIONS

POLAND
Wind energy market study Eastern Europe. Poland, 20:7610 (R;DK)

POLARIMETERS
A review of high energy polarimetry, with a view toward RHIC, 20:8338 (R;US)

POLARIZED BEAMS
Depolarization in the SLC Collider Arcs, 20:8306 (R;US)
Polarization at SLAC, 20:8329 (R;US)

POLARIZED TARGETS
Review of the SLAC and Les Houches workshops, 20:8330 (R;US)

POLLUTANTS
Estimating exposure of terrestrial wildlife to contaminants, 20:8641 (R;US)
Toxicological benchmarks for screening potential contaminants of concern for effects on soil and litter invertebrates and heterotrophic process, 20:8642 (R;US)

POLLUTION CONTROL EQUIPMENT
See also AFTERBURNERS
AIR FILTERS
ELECTROSTATIC PRECIPITATORS
SCRUBBERS
Full report: Assessment and opportunity identification of energy efficient pollution prevention technologies and processes, 20:8040 (R;US)
High SO_2 removal efficiency testing. Quarterly status report, April–June, 1994, 20:7634 (R;US)
Methods of valuing air pollution and estimated monetary values of air pollutants in various U.S. regions, 20:7849 (R;US)
Summary report: Assessment and opportunity identification of energy efficient pollution prevention technologies and processes, 20:8039 (R;US)

POLLUTION REGULATIONS
Catalog of CERCLA applicable or relevant and appropriate requirements (ARARs) - fact sheets, 20:7859 (R;US)

POLY(ISOBUTYLENE OXIDE)
See ORGANIC POLYMERS

POLYACRYLONITRILE
See ORGANIC POLYMERS

POLYATOMIC MOLECULES
See MOLECULES

POLYCRYSTALS
Mass transport through polycrystalline microstructures, 20:8107 (R;US)

POLYESTERS
Specific heat capacity and melting/crystallisation characteristics of polytridecanolactone, 20:8052 (RA;SE)

POLYETHYLENE TERPHTHALATE
See POLYESTERS

POLYETHYLENES
Pulse radiolysis of alkanes: A time-resolved electron paramagnetic resonance study, 20:8197 (R;US)

POLYMERASE CHAIN REACTION
Use of labeled primers for differential display, 20:8572 (R;US)

POLYMERS
See also ORGANIC POLYMERS
A study on the polymer catalyst manufacturing technology, 20:7517 (R;KR;In Korean)
Development of polymer catalyst manufacturing technology, 20:7515 (R;KR;In Korean)
Electrical conductivity study on polythiophenes films, 20:8977 (R;XA)

POLYNOMIALS
Newton Raphson method, scaling at fractal boundaries and Mathematica, 20:8669 (R;XA)

POLYSACCHARIDES
Polysaccharides and bacterial plugging. Final report, 1992–1993, 20:7200 (R;US)

POLYSTYRENE
Possible future directions for extruded polystyrene foam insulation, 20:7987 (RA;US)

POLYTETRAOXANE
See ORGANIC POLYMERS

POLYTHENE
See POLYETHYLENES

POLYURETHANES
Cyclopentane as blowing agent for rigid polyurethane foam in refrigerator insulation, 20:8035 (RA;US)

POOR PEOPLE
See LOW INCOME GROUPS

PORK
See MEAT

PORTABLE EQUIPMENT
Road Transportable Analytical Laboratory (RTAL) system. Quarterly progress report, February 1994–April 1994, 20:8344 (R;US)
Road Transportable Analytical Laboratory (RTAL) system. Quarterly progress report, May 1994–July 1994, 20:8345 (R;US)

PORTMANTEAU EVENT
See NUCLEAR EXPLOSIONS
UNDERGROUND EXPLOSIONS

POSITION SENSITIVE DETECTORS
Study on the large position sensitive detector, 20:8343 (R;CN;In Chinese)

POSITRON BEAMS
A new target concept for production of slow positrons, 20:8261 (R;US)

POSITRON SOURCES
A new target concept for production of slow positrons, 20:8261 (R;US)

POSITRON-ELECTRON-PROTON STORAGE RING
See PEP STORAGE RINGS

POSITRONIUM
Positronium interactions with transition metals in sodium dodecyl sulfate micellar systems (SDS)., 20:8969 (IA;MX)
Vacuum polarization correction to the positronium decay rate, 20:8966 (R;RU)

POTABLE WATER
See DRINKING WATER

POTASSIUM
Core scanning for Th, U and K. Problems and solutions, 20:8469 (R;DK)

POTATO PLANT
See SOLANUM TUBEROSUM

POTATO TUBERS
See POTATOES

POTATOES
Development of technique on the induction and selection of in vitro mutant lines (Potato, Solanum tuberosum L.), 20:8603 (R;KR;In Korean)

POTENTIAL SCATTERING
Application of square integrable basis functions for scattering problems. A comparison between approaches based on Toeplitz matrices and negative imaginary potentials, 20:8661 (RA;IL)
Complex scattering dynamics and the quantum Hall effects, 20:8681 (R;US)

POTT-BROCHE PROCESS
See COAL LIQUEFACTION

POWER DEMAND
Appendix model performance - model documentation renewable fuels module of the National Energy Modeling System, 20:7886 (R;US)
Documentation of the petroleum market model (PMM). Appendix: Model developer's report, 20:7236 (R;US)
Progress in the standardization of DSM terminology, reporting formats, and evaluation protocols, 20:7912 (R;US)

POWER GENERATION
See also COGENERATION
Economic analysis of nuclear power generation, 20:7860 (R;KR;In Korean)
Issues and methods in incorporating environmental externalities into the integrated resource planning process, 20:7863 (R;US)
Programme and book of abstracts, 20:7834 (I;CH;In English, German, French)

POWER PLANTS
See also DUAL-PURPOSE POWER PLANTS
FUEL CELL POWER PLANTS
HYDROELECTRIC POWER PLANTS
WIND POWER PLANTS
Experience of reliability of programmable control systems, 20:7632 (R;FI;In Finnish)

POWER TRANSMISSION
A study on the performance evaluation technique of prefabricated Ondol(II), 20:7964 (R;KR;In Korean)

Performance issues for a changing electric power industry, 20:7908 (R;US)

POWER TRANSMISSION LINES
Final joint environmental assessment for the construction and routine operation of a 12-kilovolt (KV) overhead powerline right-of-way, and formal authorization for a 10-inch and 8-inch fresh water pipeline right-of-way, Naval Petroleum Reserve No. 1, Kern County, California, 20:7824 (R;US)

PRECIPITATIONS (ATMOSPHERIC)
See ATMOSPHERIC PRECIPITATIONS

PREFABRICATED BUILDINGS
Field measurements of heating efficiency of electric forced-air furnaces in six manufactured homes, 20:7960 (R;US)

PRESSES
Apparatus for restraining and transporting dies, 20:8242 (PA;US)

PRESSURE TUBES
Development of high pressure two-phase choked flow analysis methodology in complex piping system, 20:8252 (R;KR;In Korean)

PRESSURE VESSELS
Apparatus for unloading pressurized fluid, 20:7822 (PA;US)
Load capacity analysis of RPV failure, 20:7805 (RA;DE;In German)
Mechanical loads on internal containment structures, 20:7804 (RA;DE;In German)
Production and testing of the VITAMIN-B6 fine group and the BUGLE-93 broad-group neutron/photon cross-section libraries derived from ENDF/B-VI nuclear data, 20:7648 (R;US)

PRESSURIZED HEAVY WATER COOLED/MODERATED REACTOR
See PHWR TYPE REACTORS

PRESSURIZED WATER COOLED MODERATED REACTOR
See PWR TYPE REACTORS

PRESSURIZED WATER REACTORS
See PWR TYPE REACTORS

PRESSURIZERS
Thermal-Hydraulics of a steam discharge system, 20:7663 (R;KR;In Korean)

PRIMARY COOLANT CIRCUITS
Development of detection technique for fatigue crack due to thermal stratification phenomena in RCS piping, 20:7660 (R;KR;In Korean)
Study on LOMI decontamination technology, 20:8609 (R;CN;In Chinese)

PROCESS DEVELOPMENT UNITS
Scale-up of mild gasification to a process development unit. Quarterly report, February 1994–May 1994, 20:7103 (R;US)

PROCESSING (ORES)
See ORE PROCESSING

PROCESSING (WASTES)
See WASTE PROCESSING

PRODUCTION (HYDROGEN)
See HYDROGEN PRODUCTION

PRODUCTION (PLASMA)
See PLASMA PRODUCTION

PROPADIENE
See ALLENE

PROPANE
Natures refrigerant - propane, 20:8006 (RA;US)
Winter fuels report. Week ending: January 20, 1995, 20:7885 (R;US)

PROPANOLS
Study on the hydrogen reaction technologies related to the chemical heat pump system (II), 20:7535 (R;KR;In Korean)

PROPANONE
See ACETONE

PROPOSALS
[Generic ecosystem model for assessing the effects of elevated carbon dioxide on ecosystems]. [Annual] report, July 1, 1988–June 30, 1989, 20:8570 (R;US)

PROPYL ALCOHOLS
See PROPANOLS

PROTECTION
See SAFETY

PROTECTION (RADIATION)
See RADIATION PROTECTION

PROTECTIVE COATINGS
Robotic weld overlay coatings for erosion control. Quarterly technical progress report, July–September, 1994, 20:8078 (R;US)
Structural alloy with a protective coating containing silicon or silicon-oxide, 20:8104 (PA;US)

PROTEIN SEQUENCING
See AMINO ACID SEQUENCE

PROTEIN STRUCTURE
A method to recognize distant repeats in protein sequences, 20:8557 (RA;US)
A new method to configure protein side-chains in homology modelling, 20:8555 (RA;US)
Coordinated changes in protein multiple sequence alignments, 20:8556 (RA;US)
Prediction of protein folding pathways, 20:8554 (RA;US)
Toward the unification of sequence and structural data for identification of structural and functional constraints, 20:8560 (RA;US)

PROTEINS
Biopolymer sequences and structures, 20:8565 (RA;US)
Molecular characterization of a maize regulatory gene. Final Progress report, November 1992–March 14, 1994, 20:8580 (R;US)
Molecular characterization of a maize regulatory gene. Progress report, July 1989–March 1990, 20:8579 (R;US)
Nonalignability and noncompactness models and reality of low-complexity protein segments, 20:8567 (RA;US)
Overview of selected molecular biological databases, 20:8553 (R;US)
Syntheses of nucleic acid and protein in somatic embryos of Fritillaria ussuriensis maxim in different development stages, 20:8596 (R;CN)

PROTON BLOCKING
See PROTON CHANNELING

PROTON CHANNELING
Energy dependence of radiation yield of resonance nuclear reactions prompted by channeled protons in axial and plane channels of Nb-N_x and Re-C_x systems, 20:8946 (IA;RU;In Russian)

PROTON REACTIONS
CFUP1- a program for calculating neutron or charged particle induced reactions on fissile nuclei in energy range up to 35 MeV, 20:9156 (RA;CN)
CMUP2- a program for calculating neutron or charged particle induced reactions in energy range up to 50 MeV, 20:9155 (RA;CN)
Progress on the evaluation of charged particle nuclear reaction data in Sichuan University, 20:8905 (RA;CN)

PROTON-ANTIPROTON INTERACTIONS
Search for supersymmetric $\tilde{W}_1$ and $\tilde{Z}_2$ states using the D0 detector, 20:8788 (R;US)
Study of the structure of the events produced in soft $\bar{p}p$ interactions at $\sqrt{s}$ = 1800 GeV, 20:8789 (R;US)

PROTON-INDUCED X-RAY EMISSION ANALYSIS
See PIXE ANALYSIS

PROTON-NEUTRON INTERACTIONS
New results in nucleon-nucleon scattering at intermediate energies, 20:8777 (R;US)

PROTON-NUCLEON INTERACTIONS
See also PROTON-NEUTRON INTERACTIONS
PROTON-PROTON INTERACTIONS
Search for exotic baryons with the SPHINX facility, 20:8832 (R;RU)

PROTON-PROTON INTERACTIONS
New results in nucleon-nucleon scattering at intermediate energies, 20:8777 (R;US)
Proton-proton interactions using the RHIC polarized collider, 20:8776 (R;US)
Spin Effects in pp-Scattering at Diffraction Range and RHIC Energies, 20:8800 (R;XJ)

PROTONS
See also DIPROTONS

Rapidity Distributions of Protons in (p, d, α, C)C-Interactions at 4.2 GeV/c per Nucleon, 20:8933 (R;XJ;In Russian)
Spin puzzle in nucleon, 20:8755 (R;XA)
W-charge asymmetry at CDF, tests of structure functions, 20:8827 (R;US)

PSEUDOSCALAR MESONS
See also B MESONS
D MESONS
PIONS
Instantaneous Chiral Quark Model for Relativistic Mesons in a Hot and Dense Medium, 20:8835 (R;XJ)

PSI RESONANCES
See MESONS

PSI-4300 RESONANCES
See MESONS

PUBLIC BUILDINGS
Blazing the energy trail: The Municipal Energy Management Program, 20:8044 (R;US)

PULMONARY LAVAGE
See LUNGS

PULPS
See SLURRIES

PULSE COLUMNS
See EXTRACTION COLUMNS

PULSE COMBUSTORS
Aerovalve pulse combustion: Technical note, 20:8266 (R;US)

PULSE DISCRIMINATORS
Hybrid discriminator for microstrip silicon detectors, 20:8368 (R;RU;In Russian)
Nuclear reaction analysis - Development and application, 20:8394 (R;SE)

PULSE INTEGRATORS
Ultrafast, high precision gated integrator, 20:8269 (R;US)

PULSED FUSION REACTORS
Radioactivity computation of steady-state and pulsed fusion reactors operation, 20:9095 (R;US)

PULVERIZED FUEL ASH
See FLY ASH

PULVERIZED FUELS
Air toxics evaluation of ABB Combustion Engineering Low-Emission Boiler Systems, 20:7174 (R;US)

PUMPS
Operability test procedure [Tank] 241-SY-101 equipment removal system, 20:7405 (R;US)

PUNCHED CARDS
See MEMORY DEVICES

PWR TYPE REACTORS
See also BOHUNICE V-1 REACTOR
DIABLO CANYON-1 REACTOR
DIABLO CANYON-2 REACTOR
SHIPPINGPORT REACTOR
SURRY-1 REACTOR
SURRY-2 REACTOR
SURRY-3 REACTOR
SURRY-4 REACTOR
THREE MILE ISLAND-1 REACTOR
THREE MILE ISLAND-2 REACTOR
WWER TYPE REACTORS

Core Catchers
Studies of core catcher concepts, 20:7806 (RA;DE;In German)

Design
Advanced light water reactor plants system 80+™ design certification program. Annual progress report, October 1, 1993–September 30, 1994, 20:7652 (R;US)

Diagnostic Techniques
Experience and benefits with diagnostic systems in German PWRs, 20:7712 (RA;XA)

Fuel Cycle
A study on manufacturing and quality control technology of DUPIC fuel -A study on the direct use of spent PWR fuel in CANDU reactors-, 20:7668 (R;KR;In Korean)
Fuel management and safety analysis -A study on the direct use of spent PWR fuel in CANDU reactors-, 20:7683 (R;KR;In Korean)

Man-Machine Systems
Development of an advanced man-machine system for Japanese PWR plants, 20:7732 (RA;XA)

Meltdown
Molten core cooling systems for future PWR plants, 20:7797 (RA;DE;In German)
Studies of hydrogen distribution and combustion in PWR plants, 20:7799 (RA;DE;In German)

Nuclear Fuels
Technology development for nuclear material safeguards -A study on the direct use of spent PWR fuel in CANDU-, 20:7510 (R;KR;In Korean)

Reactor Core Disruption
Post accident core damage assessment methodology and code, 20:7651 (R;CN;In Chinese)

Reactor Operation
Development of Megawatt Demand Setter for Plant Operating Flexibility, 20:7658 (R;KR;In Korean)

Reactor Safety
The R and D program of the Nuclear Safety Research Project, 20:7790 (RA;DE;In German)

Reactor Safety Experiments
A study on the establishment of severe accident experimental facility, 20:7665 (R;KR;In Korean)

Risk Assessment
Safety requirements on future LWR plants, 20:7789 (RA;DE;In German)

Simulation
Simulation of pressurized water reactor in accidental state., 20:7654 (I;MA;In French)

Spent Fuels
DUPIC facility engineering -A study on the direct use of spent PWR fuel in CANDU reactors-, 20:7672 (R;KR;In Korean)
Fuel management and safety analysis -A study on the direct use of spent PWR fuel in CANDU reactors-, 20:7683 (R;KR;In Korean)

Systems Analysis
Development of standard logic network for PWR NSSS system design, 20:7655 (R;KR;In Korean)

Technology Assessment
Advanced light water reactor plants system 80+™ design certification program. Annual progress report, October 1, 1993–September 30, 1994, 20:7652 (R;US)

Test Facilities
A study on the establishment of severe accident experimental facility, 20:7665 (R;KR;In Korean)

PYRITE
Development of enhanced sulfur rejection processes. Final technical progress report, fifth quarter, October 1–December 31, 1993, 20:7135 (R;US)
Development of enhanced sulfur rejection processes. Final technical progress report, July 1–September 30, 1993, 20:7097 (R;US)
Removal of pyrite and trace elements from waste coal by dissolved-CO_2 flotation and chelating agents. Final technical report, September 1, 1993–August 31, 1994, 20:7098 (R;US)
Semiconductor electrochemistry of coal pyrite. Technical progress report, July–September, 1994, 20:7145 (R;US)

PYRITES
See PYRITE

PYROTEK PROCESS
See WASTE PROCESSING

PZT
Crystallization of sol-gel derived lead zirconate titanate thin films in argon and oxygen atmospheres, 20:8133 (R;AU)
Orientation of rapid thermally annealed lead zirconate titanate thin films on (111) Pt substrate, 20:8135 (R;AU)

Q

QCD
See QUANTUM CHROMODYNAMICS

QUANTUM CHROMODYNAMICS
Approximate analytic diagonalization of lattice QCD, 20:8773 (R;AU)
Chiral limit of QCD, 20:8768 (R;US)
Color, Colored Quarks, Quantum Chromodynamics, 20:8767 (R;XJ)
Recent progress in one-loop multi-parton calculations, 20:8769 (R;US)
Simulation with complex measures, 20:8774 (R;AU)
QUANTUM ELECTRODYNAMICS
See also SCHWINGER-TOMONAGA FORMALISM
Measurement of the magnetically-induced QED birefringence of the vacuum and an improved search for laboratory axions: Technical report. Project definition study of the use of assets and facilities of the Superconducting Super Collider Laboratory, 20:8754 (R;US)
QUANTUM FIELD THEORY
See also LATTICE FIELD THEORY
QUANTUM CHROMODYNAMICS
QUANTUM ELECTRODYNAMICS
QUANTUM GRAVITY
Beyond the variational principle in quantum field theory, 20:8749 (R;AU)
Covariant phase space formulations of superparticles and supersymmetric WZW models, 20:8744 (R;AU)
Light-front dynamics of Chern-Simons systems, 20:8721 (R;XA)
Supersymmetry, 20:8734 (R;US)
The solutions of affine and conformal affine Toda field theory, 20:8739 (R;AU)
q-bosons and the q-analogue quantized field, 20:8715 (R;US)
QUANTUM GRAVITY
Creation of a scalar potential in 2D dilaton gravity, 20:8737 (R;US)
QUANTUM MECHANICS
Quantum dynamics in regions of quaternionic curvature, 20:8746 (R;AU)
QUARK MODEL
See also COLOR MODEL
STRING MODELS
Instantaneous Chiral Quark Model for Relativistic Mesons in a Hot and Dense Medium, 20:8835 (R;XJ)
QUARKS
A measurement of quark and gluon jet differences at the Z^0 resonance, 20:8807 (R;US)
Comparison of gluon jets and quarks jets, 20:8794 (IA;IR;In English, Persian)
Measurement of the semi-leptonic branching ratio and the baryonic contribution in b quark disintegrations, 20:8837 (R;FR;In French)
Photon-charm production in $p\bar{p}$ collisions at $\sqrt{s}$ = 1.8 TeV, 20:8786 (R;US)
Possible reason why leptons are lighter than quarks, 20:8842 (R;AU)
Quarks search in cosmic rays, 20:8793 (IA;IR;In English, Persian)
The discovery of t quark, 20:8833 (IA;IR;In English, Persian)
Top quark and Higgs boson masses from wormhole physics, 20:8841 (R;AU)
QUENCHING (AVALANCHE)
See AVALANCHE QUENCHING

R

R MATRIX
Some functional solutions of the Yang-Baxter equation, 20:8719 (R;XA)
R-1650 RESONANCES
See MESONS
RACIAL GROUPS
See MINORITY GROUPS
RADIATION ACCIDENTS
Criticality accidents and simplified estimation of total fission number, 20:7276 (RA;XA)
RADIATION BURDEN
See RADIATION DOSES
RADIATION CHEMISTRY
State of and trends in the development of Burgas centre for electron-beam technologies and polymers, 20:7520 (IA;RU;In Russian)
RADIATION DECONTAMINATION
See DECONTAMINATION
RADIATION DETECTION
Acceptance test procedure for the 340-NT-EX stack upgrades. Project W-337, 20:7457 (R;US)
Gas chromatographic analysis of volatile hydrocarbons to detect irradiated chicken, pork and beef - an intercomparison study. A report in English and German, 20:8600 (R;DE;In English, German)
Thermoluminescence analysis to detect irradiated spices, herbs and spice-and-herb mixtures - an intercomparison study. A report in English and German, 20:8601 (R;DE;In English, German)
RADIATION DETECTORS
See also CHERENKOV COUNTERS
GAS TRACK DETECTORS
POSITION SENSITIVE DETECTORS
RADIOMETERS
SHOWER COUNTERS
1-D and 2-D processing for on-line control and data analysis assistance for the multidetector 4π INDRA, 20:8349 (R;FR;In French)
BABAR - the detector for the PEP II B Factory at SLAC, 20:8399 (R;US)
Cable connection between the detector and low-noise amplifier as an alternative of the radiation-resistant amplifiers, 20:8369 (R;RU;In Russian)
Development of high energy radiation measurement system with diode, 20:8389 (R;KR;In Korean)
Physics capabilities of the DO upgrade detector, 20:8348 (R;US)
Radon monitoring using long-range alpha detector-based technology, 20:8459 (R;US)
Road Transportable Analytical Laboratory (RTAL) system. Quarterly progress report, February 1994–April 1994, 20:8344 (R;US)
Survey speeds to detect one times and three times total contamination values from U.S. Department of Energy Radiological Control Manual, Table 2-2, 20:8398 (R;US)
RADIATION DOSEMETERS
See DOSEMETERS
RADIATION DOSES
Derivation of uranium residual radioactive material guidelines for the 4400 Piehl Road Site, Ottawa Lake, Michigan, 20:7467 (R;US)
Development of technology for biological dosimetry -A study on the radiation and environmental safety-, 20:8590 (R;KR;In Korean)
Effects of chain orientation on the radiation response of atactic polystyrene., 20:8209 (IA;MX)
Impedance measurement of irradiated potatoes: a method to identify radiation processing., 20:8207 (IA;MX)
RADIATION DOSIMETRY
See DOSIMETRY
RADIATION EXPOSURE (DOSES)
See RADIATION DOSES
RADIATION HAZARDS
Balancing radiation benefits and risks: The needs of an informed public, 20:8629 (R;US)
Development of risk-based computer models for deriving criteria on residual radioactivity and recycling, 20:7466 (R;US)
Hazards assessment document for receiving basin for offsite fuel (244-H) and resin regeneration facility (245-H) (RBOF/RRF), 20:8637 (R;US)
RADIATION HYGIENE
See RADIATION PROTECTION
RADIATION MONITORING
See also PERSONNEL MONITORING
BANKET - communication network for radiation monitoring devices, 20:8357 (RA;IL)

Development of a Real-Time radiological dose assessment system - A study on the radiation and environmental safety -, 20:8620 (R;KR;In Korean)
Environmental monitoring at Inshas area, 20:8454 (IA;EG)

RADIATION MONITORS
See also LIQUID CONTAMINATION MONITORS
SURFACE CONTAMINATION MONITORS
Operability test procedure for the 340-NT-EX stack upgrades – Project W337, 20:7458 (R;US)
Simulator for the A-SMG 90, 20:8355 (RA;IL)

RADIATION PROTECTION
Committee on Interagency Radiation Research and Policy Coordination 10th anniversary report, 20:8628 (R;US)
Development of radiation protection and measurement technology -A study on the radiation and environmental safety-, 20:8623 (R;KR;In Korean)
Implications of scientific and technological developments for radiation protection in the next decade, 20:8631 (R;US)
Interim report of the Advisory Committee on human radiation experiments, 20:8606 (R;US)
Research priorities for occupational radiation protection, 20:8626 (R;US)
Safety assessment principles for nuclear plants, 20:7643 (I;CZ;In Czech)
Selected legal documents in the field of peaceful uses of nuclear energy in the Czech Republic, 20:7882 (I;CZ;In Czech)
WAG 2 remedial investigation and site investigation site-specific work plan/health and safety checklist for the sediment transport modeling task, 20:7481 (R;US)
WAG 2 remedial investigation and site investigation site-specific work plan/health and safety checklist for the ecological assessment task, Kingfisher Study, 20:7482 (R;US)

RADIATION SAFETY
See RADIATION PROTECTION

RADIOACTIVE BIOLOGICAL WASTES
See BIOLOGICAL WASTES
RADIOACTIVE WASTES

RADIOACTIVE CLOUDS
Development of computing code system for level 3 PSA -A study for nuclear safety improvement-, 20:7756 (R;KR;In Korean)

RADIOACTIVE EFFLUENTS
Environmental Monitoring Plan, United States Department of Energy, Richland Operations Office. Revision 1, 20:7444 (R;US)
Ground water impact assessment report for the 216-B-3 Pond system, 20:7455 (R;US)
Metallurgical Laboratory Hazardous Waste Management Facility groundwater monitoring report. Third quarter, 1994, 20:7463 (R;US)
Radiation exposure due to gamma-ray submersion, 20:7753 (R;DE;In German)

RADIOACTIVE GASEOUS WASTES
See GASEOUS WASTES
RADIOACTIVE WASTES

RADIOACTIVE MATERIALS
See also FISSION PRODUCTS
RADIOACTIVE WASTES
Department of Energy Plutonium ES&H Vulnerability Assessment Savannah River Site interim compensatory measures, 20:7286 (R;US)
Environmental analysis of Lower Pueblo/Lower Los Alamos Canyon, Los Alamos, New Mexico, 20:7477 (R;US)
Tank waste processing analysis: Database development, tank-by-tank processing requirements, and examples of pretreatment sequences and schedules as applied to Hanford Double-Shell Tank Supernatant Waste - FY 1993, 20:7338 (R;US)
Test and evaluation report, U.S. Department of Transportation Specification 7A Type A radioactive material packaging, WHC Solid Sample Package (unshielded) (3M SafeSend® Reusable Super Pack Shipping System [SP-R1L Kit]), 20:8248 (R;US)
Test plan for a U.S. Department of Transportation Specification 7A Type A radioactive material packaging, WHC Liquid Sample Package (unshielded) (3M SafeSend® Reusable Super Pack Shipping System [SP-R1L Kit]), 20:8247 (R;US)
Toxicity values from the U.S. Environmental Protection Agency Integrated Risk Information System and Health Effects Assessment Summary Table, 20:8639 (R;US)

RADIOACTIVE PARTICULATES
See PARTICLES

RADIOACTIVE WASTE DISPOSAL
A review of the scope and the cost of the Swedish nuclear waste management system, 20:7684 (R;SE)
Area 5 Site characterization project report, FY 1994, 20:7443 (R;US)
Final report of the AECL/SKB Cigar Lake analog study, 20:7358 (R;SE)
Modelling gas generation in radioactive waste repositories, 20:7288 (R;GB)
The structure of conceptual models with application to the Aespoe HRL project, 20:7359 (R;SE)
Trends in safety assessment of radioactive waste repositories, 20:7295 (IA;CH)

RADIOACTIVE WASTE FACILITIES
See also WIPP

Air Pollution Monitoring
Operability test procedure for the 340-NT-EX stack upgrades – Project W337, 20:7458 (R;US)

Control Equipment
Domestic production of control parts for the nuclear waste treatment facility, 20:8390 (R;KR;In Korean)

Criticality
Nuclear criticality safety evaluation – DWPF Late Wash Facility, Salt Process Cell and Chemical Process Cell, 20:8227 (R;US)

Decommissioning
Decontamination and dismantlement of the Argonne National Laboratory-East Map Tube Facility, 20:7468 (R;US)
FY 1995 Remedial Investigation Work Plan for Waste Area Grouping 2 at Oak Ridge National Laboratory, Oak Ridge, Tennessee, 20:7298 (R;US)

Decontamination
Decontamination and dismantlement of the Argonne National Laboratory-East Map Tube Facility, 20:7468 (R;US)

Design
Design assessment for Melton Valley liquid low-level waste collection and transfer system upgrade project at Oak Ridge National Laboratory, Oak Ridge, Tennessee, 20:7297 (R;US)

Extraction Columns
242-A Evaporator ion exchange column (IX-D-1) tie down evaluation, 20:7391 (R;US)

Hazardous Materials Spills
T Plant hazards assessment, 20:7495 (R;US)

Heat Transfer
Modeling of the fault-controlled hydrothermal ore-forming systems, 20:7328 (R;US)

Hydraulic Conductivity
Direct measurements of transport properties are essential for site characterization, 20:7452 (R;US)

Information Needs
Tank Waste Remediation System tank waste pretreatment and vitrification process development testing requirements assessment, 20:7411 (R;US)

Mass Transfer
Modeling of the fault-controlled hydrothermal ore-forming systems, 20:7328 (R;US)

Operation
200 Area weekly report, 20:7310 (R;US)
200 Area weekly report, 20:7308 (R;US)
200 Area weekly report, 20:7309 (R;US)

Performance Testing
Tank Waste Remediation System tank waste pretreatment and vitrification process development testing requirements assessment, 20:7411 (R;US)

Radiation Accidents
T Plant hazards assessment, 20:7495 (R;US)

Radiation Monitoring
Operability test procedure for the 340-NT-EX stack upgrades – Project W337, 20:7458 (R;US)

Radiometric Surveys
Environmental analysis of Lower Pueblo/Lower Los Alamos Canyon, Los Alamos, New Mexico, 20:7477 (R;US)

Remedial Action
Environmental analysis of Lower Pueblo/Lower Los Alamos Canyon, Los Alamos, New Mexico, 20:7477 (R;US)
The cascade of reservoirs of the "Mayak" Plant: Case history and the first version of a computer simulator, 20:7479 (R;US)

Risk Assessment
T Plant hazards assessment, 20:7495 (R;US)

Site Characterization
Combined analysis of surface reflection imaging and vertical seismic profiling at Yucca Mountain, Nevada, 20:7329 (R;US)
Geohydrologic data collected from shallow neutron-access boreholes and resultant-preliminary geohydrologic evaluations, Yucca Mountain area, Nye County, Nevada, 20:7366 (R;US)
Progress on flow visualization and relative permeability measurement in transparent replicas of natural fractures from Yucca Mountain, 20:7330 (R;US)

Specifications
200 Area treated effluent disposal facility operational test specification, 20:7374 (R;US)

Stress Analysis
Wind and seismic analysis for liquid-level gauge support, 20:7395 (R;US)

Switches
BCP selector valves and limit switches, 20:7381 (R;US)

Tanks
242-A Evaporator Condensate Tank (TK-C-100) tie down evaluation, 20:7499 (R;US)

Valves
BCP selector valves and limit switches, 20:7381 (R;US)

RADIOACTIVE WASTE MANAGEMENT
See also RADIOACTIVE WASTE DISPOSAL
RADIOACTIVE WASTE PROCESSING
RADIOACTIVE WASTE STORAGE
A review of the scope and the cost of the Swedish nuclear waste management system, 20:7684 (R;SE)
A study on the radioactive waste management for DUPIC fuel cycle - A study on the direct use of spent PWR fuel in CANDU, 20:7320 (R;KR;In Korean)
Applications of multicriteria decision making methods in Czech nuclear energetics, 20:7318 (IA;CZ)
Budget estimates - fiscal years 1996-1997, 20:7682 (R;US)
Criticality safety evaluation report for K Basin filter cartridges, 20:7376 (R;US)
Historical Tank Content Estimate for the Northwest Quandrant of the Hanford 200 East Area, 20:7400 (R;US)
Historical Tank Content Estimate for the Southwest Quandrant of the Hanford 200 West Area, 20:7401 (R;US)
Nordic nuclear safety research. Project plans for the 1994 - 1997 program, 20:7818 (R;DK;In Danish, Norwegian, English, Swed)
Project Specific Quality Assurance Plan (QAPP), 20:7388 (R;US)
The mining Pribram in science and technology. Section MC: Mathematical methods in geology, 20:9165 (I;CZ;In Czech)
The radioactive waste safety standards (RADWASS) programme. A series of international consensus documents on the safe management and disposal of radioactive waste, 20:7316 (I;XA)
Waste management assessment and technical review programme. WATRP. An international peer review service for radioactive waste management activities, 20:7317 (I;XA)

RADIOACTIVE WASTE PROCESSING
Cesium cobaltdicarbollide-solubility, precipitation, and reactivity in basic aqueous solution, 20:7433 (R;US)
Distributions of 15 elements on 58 absorbers from simulated Hanford Double-Shell Slurry Feed (DSSF), 20:7478 (R;US)
Evaluation of plasma melter technology for verification of high-sodium content low-level radioactive liquid wastes: Demonstration test No. 4 preliminary test report, 20:7422 (R;US)
Global modeling of Hanford tank waste pretreatment alternatives within a total cleanup system using ASPEN PLUS™, 20:7371 (R;US)
Insights on radiological risks of US Department of Energy radioactive waste management alternatives in the Environmental Management Programmatic Environmental Impact Statement, 20:7465 (R;US)
Operating cost guidelines for benchmarking DOE thermal treatment systems for low-level mixed waste, 20:7336 (R;US)
Tank waste processing analysis: Database development, tank-by-tank processing requirements, and examples of pretreatment sequences and schedules as applied to Hanford Double-Shell Tank Supernatant Waste - FY 1993, 20:7338 (R;US)
Technical policy with radioactive wastes management, 20:7354 (IA;CH)

RADIOACTIVE WASTE STORAGE
Criticality
Criticality safety evaluation report for K Basin filter cartridges, 20:7376 (R;US)

Equipment
Caustic addition system operability test procedure, 20:7404 (R;US)

Inspection
Subsurface barrier verification technologies, informal report, 20:7290 (R;US)

Materials Handling Equipment
Light Duty Utility Arm interface control document plan, 20:7380 (R;US)

Mathematical Models
Evaporation analysis for Tank SX-104, 20:7399 (R;US)

Monitoring
Criticality safety evaluation report for K Basin filter cartridges, 20:7376 (R;US)
Historical Tank Content Estimate for the Northwest Quandrant of the Hanford 200 East Area, 20:7400 (R;US)
Historical Tank Content Estimate for the Southwest Quandrant of the Hanford 200 West Area, 20:7401 (R;US)
Project W-340 long reach arm retrieval system balance of plant instrumentation workshop engineering study, 20:7389 (R;US)
Purex canyon exhaust fan bearing temperature monitoring system doric 245 datalogger programming, 20:7408 (R;US)

Risk Assessment
Insights on radiological risks of US Department of Energy radioactive waste management alternatives in the Environmental Management Programmatic Environmental Impact Statement, 20:7465 (R;US)

Safety
Acceptance test procedure for the MO-294 Building, 20:7373 (R;US)

Safety Analysis
45-Day safety screening for Tank 241-C-103 push mode sample, riser 2, 20:7500 (R;US)
Tank 41H bounding uranium enrichment. Revision 1, 20:7506 (R;US)

Safety Engineering
241-BY-106 sampling test plan, 20:7420 (R;US)
Characterization of Hanford tank wastes containing ferrocyanides, 20:7345 (R;US)
High-heat tank safety issue resolution program plan. Revision 2, 20:7489 (R;US)
Tank 241-SY-103 auger samples, risers 7A, 14B and 22A, 20:7397 (R;US)

Surveillance
Accelerated characterization of metal fuel stored in the Hanford K basins, 20:7372 (R;US)

Thermal Analysis
Evaluation of storing Shippingport Core II spent blanket fuel assemblies in the T Plant PWR Core II fuel pool without active cooling, 20:7666 (R;US)

RADIOACTIVE WASTES
See also ALPHA-BEARING WASTES
HIGH-LEVEL RADIOACTIVE WASTES
LOW-LEVEL RADIOACTIVE WASTES
RADIOACTIVE EFFLUENTS

Alkaline Hydrolysis
The solubility of $Cr(OH)_3(am)$ in concentrated NaOH and $NaOH-NaNO_3$ solutions, 20:7349 (R;US)
Calcination
Chemistry of proposed calcination/dissolution processing of Hanford Site tank wastes, 20:7369 (R;US)
Chemical Analysis
Characterization of Hanford tank wastes containing ferrocyanides, 20:7345 (R;US)
Chemical Properties
Tank 241-SY-103 auger samples, risers 7A, 14B and 22A, 20:7397 (R;US)
Classification
Upfront Delisting of F006 Mixed Waste, 20:7440 (R;US)
Decontamination
Waste generation forecast for DOE-ORO's Environmental Restoration OR-1 Project: FY 1995-FY 2002, September 1994 revision, 20:7313 (R;US)
Degassing
Grout gas generation test plan, 20:7416 (R;US)
Dissolution
Chemistry of proposed calcination/dissolution processing of Hanford Site tank wastes, 20:7369 (R;US)
Forecasting
Thirty-Year Solid Waste Generation Forecast by Treatability Group, 20:7461 (R;US)
Thirty-Year Solid Waste Generation Maximum and Minimum Forecast for SRS, 20:7462 (R;US)
Waste generation forecast for DOE-ORO's Environmental Restoration OR-1 Project: FY 1995-FY 2002, September 1994 revision, 20:7313 (R;US)
Gases
Grout gas generation test plan, 20:7416 (R;US)
Ground Disposal
Sampling and analysis of soil from the old F-Area effluent ditch and its surrounding wetlands, 20:7435 (R;US)
Hydrogen Production
Hydrogen production in the K-Basin ion exchange columns, modules and cartridge filters, 20:7377 (R;US)
Land Transport
Rollover analysis of rotary mode core sampler truck No. 2, 20:7501 (R;US)
Legislation
Selected legal documents in the field of peaceful uses of nuclear energy in the Czech Republic, 20:7882 (I;CZ;In Czech)
Monitoring
Engineering scale mixing system tests for MWTF title II design, 20:7386 (R;US)
Physical Properties
Characterization of Hanford tank wastes containing ferrocyanides, 20:7345 (R;US)
Tank 241-SY-103 auger samples, risers 7A, 14B and 22A, 20:7397 (R;US)
Remedial Action
WAG 2 remedial investigation and site investigation site-specific work plan/health and safety checklist for the ecological assessment task, Kingfisher Study, 20:7482 (R;US)
WAG 2 remedial investigation and site investigation site-specific work plan/health and safety checklist for the sediment transport modeling task, 20:7481 (R;US)
Remote Handling
Project W-340 long reach arm retrieval system balance of plant instrumentation workshop engineering study, 20:7389 (R;US)
Removal
Technology study of Gunite tank sludge mobilization at Oak Ridge National Laboratory, Oak Ridge, Tennessee, 20:7484 (R;US)
Retrieval Systems
Decision and systems analysis for underground storage tank waste retrieval systems and tank waste remediation system, 20:7364 (R;US)
Sampling
200 Area TEDF interface control document, 20:7383 (R;US)
241-BY-106 sampling test plan, 20:7420 (R;US)
45-Day safety screening for Tank 241-C-103 push mode sample, riser 2, 20:7500 (R;US)
Strategy for sampling Hanford Site tank wastes for development of disposal technology, 20:7410 (R;US)
Test report – Prototype core sampler, 20:7421 (R;US)
Separation Processes
Salt splitting of sodium-dominated radioactive waste using ceramic membranes, 20:7347 (R;US)
Temperature Control
High-heat tank safety issue resolution program plan. Revision 2, 20:7489 (R;US)
Thermal Analysis
Characterization of Hanford tank wastes containing ferrocyanides, 20:7345 (R;US)
Transmutation
Funneling in LANL high intensity linac designs, 20:7325 (R;US)
Underground Disposal
Evaluation of the effectiveness of the sealed double-ringed infiltrometers and the effects of changes in atmospheric pressure on hydraulic conductivity, 20:7438 (R;US)
Underground Storage
Ammonia in simulated Hanford double-shell tank wastes: Solubility and effects on surface tension, 20:7339 (R;US)
Decision and systems analysis for underground storage tank waste retrieval systems and tank waste remediation system, 20:7364 (R;US)
Technology study of Gunite tank sludge mobilization at Oak Ridge National Laboratory, Oak Ridge, Tennessee, 20:7484 (R;US)
Vitrification
Development of a Transportable Vitrification System for Mixed Waste, 20:7432 (R;US)
Slanted baffle mist eliminator, 20:7337 (PA;US)
Volume
Estimation and characterization of decontamination and decommissioning solid waste expected from the Plutonium Finishing Plant, 20:7368 (R;US)
Waste Retrieval
Parametric design using IGRIP, 20:7353 (R;US)

RADIODIAGNOSIS (RADIONUCLIDES)
See NUCLEAR MEDICINE

RADIOECOLOGY
Nordic nuclear safety research. Project plans for the 1994 - 1997 program, 20:7818 (R;DK;In Danish, Norwegian, English, Swed)

RADIOGRAPHY (INDUSTRIAL)
See INDUSTRIAL RADIOGRAPHY

RADIOISOTOPE MIGRATION
See RADIONUCLIDE MIGRATION

RADIOISOTOPE-LABELLED DRUGS
See RADIOPHARMACEUTICALS

RADIOISOTOPES
See also BETA DECAY RADIOISOTOPES
YEARS LIVING RADIOISOTOPES
Analysis of radioactive waste samples by ion chromatography-ICP/MS, 20:7352 (R;US)
Photonuclear reactions of complex nuclei at intermediate energies., 20:8912 (IA;MX)
Studies on application of radiation and radioisotopes, 20:8602 (R;KR;In Korean)
Studies on the production and application of radioisotopes - Studies on application of radiation and radioisotopes-, 20:7519 (R;KR;In Korean)

RADIOLOGICAL PROTECTION
See RADIATION PROTECTION

RADIOMETERS
Broadband radiometer, 20:8413 (PA;US)

RADIONUCLIDE MIGRATION
Aespoe Hard Rock Laboratory. Annual Report 1993, 20:7360 (R;SE)
Computer simulation of radionuclide transport through thermal convection of groundwater from borehole repositories, 20:7327 (R;US)
Development of hydrogeological modelling approaches for assessment of consequences of hazardous accidents at nuclear power plants, 20:8499 (R;US)

The cascade of reservoirs of the "Mayak" Plant: Case history and the first version of a computer simulator, 20:7479 (R;US)
Transport of radionuclides in fresh water stream, 20:8539 (IA;EG)

RADIONUCLIDE TRANSFER (IN ENVIRONMENT)
See RADIONUCLIDE MIGRATION

RADIONUCLIDES
See RADIOISOTOPES

RADIOPHARMACEUTICALS
The use of microwave oven for ^{51}Cr (CrIII) complexation reactions, 20:8213 (RA;IL)

RADIUM
Radium in humans: A review of U.S. studies, 20:8608 (R;US)

RADON
Cellular morphometry and cycling cell populations of human and dog bronchi. Annual progress report, April 1, 1994–March 31, 1995, 20:8612 (R;US)
Measurement of volumic activities of radon in air in houses and in working rooms with solid state nuclear track detectors, 20:8452 (I;MA;In French)
Radon in dwellings in selected areas of Ireland, 20:8465 (R;IE)
Radon monitoring using long-range alpha detector-based technology, 20:8459 (R;US)
Toward resolving model-measurement discrepancies of radon entry into houses, 20:8460 (R;US)

RADON 222
Alpha-particle spectrum of ^{222}Rn and its daughters using silicon surface-barrier detectors., 20:8371 (IA;MX)
Study of radon-222 emanation from sedimentary phosphates and corresponding phosphogypsum. Temperature effect, 20:8491 (I;MA;In French)

RAIN WATER
Isotopic characteristics of meteoric water and groundwater in the Sahelo-Sudanese zone, 20:8532 (RA;XA;In French)

RANDOMNESS
Decoherence, determinism and chaos revisited, 20:8682 (R;US)

RARE EARTH COMPOUNDS
See also GADOLINIUM COMPOUNDS
HOLMIUM COMPOUNDS
LANTHANUM COMPOUNDS
Study on the extraction of Am^{3+} and rare earth elements with β-oxime extractant (7804) (I), 20:8153 (R;CN;In Chinese)

RARE EARTHS
See also CERIUM
YTTERBIUM
Process to remove rare earth from IFR electrolyte, 20:7278 (PA;US)

RATS
Pathology study of radiation injury in the rat testes, 20:8610 (R;CN;In Chinese)

RAW MATERIALS
See also CHEMICAL FEEDSTOCKS
Studies on control of integrated plants, 20:8031 (R;NO)

RAWALPINDI RESEARCH REACTOR
See PARR REACTOR

RBMK TYPE REACTORS
See LWGR TYPE REACTORS

RDF
See REFUSE DERIVED FUELS

REACTION KINETICS
Fast reactions in the positron spur in polar solvents., 20:8968 (IA;MX)

REACTION MECHANISMS
See REACTION KINETICS

REACTION RATE
See REACTION KINETICS

REACTIVITY
Forecast reactivity program for complex loadings, 20:7717 (RA;XA)

REACTOR ACCIDENTS
See also LOSS OF COOLANT
MELTDOWN
REACTOR CORE DISRUPTION
Application of artificial neural networks in estimation of probable accident causes in nuclear power plants, 20:7745 (RA;XA)
CONTAIN independent peer review, 20:7817 (R;US)
Environmental impact of Pakistan Research Reactor-2 following a hypothetical radiological release accident, 20:7759 (R;PK)
Human event observations in the individual plant examinations, 20:7823 (R;US)
Modeling and assessment of accident consequences; development of RODOS, a real-time on-line decision support system for nuclear emergencies in Europe, 20:7816 (RA;DE;In German)
Technical boundary conditions for an accident filter, 20:7808 (RA;DE;In German)
The development of a severe accident analysis code -Research on the improvement of nuclear safety-, 20:9172 (R;KR;In Korean)
Uncertainty and sensitivity analysis of chronic exposure results with the MACCS reactor accident consequence model, 20:7820 (R;US)
Uncertainty and sensitivity analysis of early exposure results with the MACCS Reactor Accident Consequence Model, 20:7821 (R;US)

REACTOR COMPONENTS
See also BREEDING BLANKETS
CONTROL ELEMENTS
CORE CATCHERS
FUEL ELEMENTS
REACTOR CORES
A study on the change in dynamic characteristics of reactor internals, 20:7692 (R;KR;In Korean)
Advanced light water reactor plants system 80+™ design certification program. Annual progress report, October 1, 1993–September 30, 1994, 20:7652 (R;US)
Core damage frequency observations and insights of LWRs based on the IPEs, 20:7649 (R;US)
Development of stainless steels for nuclear power plant - Advanced nuclear materials development -, 20:8099 (R;KR;In Korean)
Human event observations in the individual plant examinations, 20:7823 (R;US)
Program for calculation of two-dimensional nonstationary temperature fields in NPP arbitrary geometrical element, 20:7691 (R;RU;In Russian)

REACTOR CONTROL RODS
See CONTROL ELEMENTS

REACTOR CONTROL SYSTEMS
Development of PC-based FFT system for reactor dynamic analysis, 20:7644 (R;PK)
Intelligence operator support system, 20:7725 (RA;XA)

REACTOR CORE DISRUPTION
Analysis of core disruptive accidents in fast reactors, 20:7792 (RA;DE;In German)
Papers presented as part of the status report of the Nuclear Safety Research Project of the Karlsruhe Nuclear Center on 23 March 1994, 20:7788 (R;DE;In German)
Post accident core damage assessment methodology and code, 20:7651 (R;CN;In Chinese)

REACTOR CORES
Relative performance properties of the ORNL Advanced Neutron Source Reactor with reduced enrichment fuels, 20:7763 (R;US)

REACTOR DECOMMISSIONING
Decommissioning of Swedish nuclear power reactors. Technology and costs, 20:7647 (R;SE;In Swedish)

REACTOR FUEL ELEMENTS
See FUEL ELEMENTS

REACTOR FUELS
See NUCLEAR FUELS

REACTOR INSTRUMENTATION
Laboratory instrumentation modernization at the WPI Nuclear Reactor Facility, 20:7766 (R;US)
The construction of environments for development of test and verification technology -The development of advanced instrumentation and control technology-, 20:8337 (R;KR;In Korean)
The establishment of master plan for developing advanced I and C technology -The development of advanced instrumentation and control technology-, 20:8336 (R;KR;In Korean)

REACTOR LATTICES
Improvements in a four factor formula recipe for lattice calculations, 20:7687 (R;DK)

REACTOR MATERIALS
See also NUCLEAR FUELS
Progress in tritium retention and release modeling for ceramic breeders, 20:7675 (R;US)
Status of the solid breeder materials database, 20:7674 (R;US)

REACTOR MONITORING SYSTEMS
FASMON monitoring of space dependent oscillations in a BWR, 20:7706 (R;SE)
On-line operator support system integrated with monitoring and diagnosis system, 20:7714 (RA;XA)
Upgrading the VERONA core monitoring system, 20:7713 (RA;XA)

REACTOR OPERATION
Development of Megawatt Demand Setter for Plant Operating Flexibility, 20:7658 (R;KR;In Korean)

REACTOR OPERATORS
CANDU operator decision support systems: Lessons learned and future directions, 20:7715 (RA;XA)
Classification of NPP operator support systems and problems with their implementation, 20:7716 (RA;XA)
Creation of a computerized operator support system at Unit 5 of the Novovoronezh Nuclear Power Plant, 20:7729 (RA;XA)
Instruction texts and problems for the training and examination of selected personnel at research nuclear facilities, 20:9135 (I;CZ;In Czech)
Operator support systems in nuclear power plants. Proceedings of a specialists meeting held in Moscow, Russian Federation, 17-21 May 1993, 20:7709 (R;XA)
Team interaction skills evaluation criteria for nuclear power plant control room operators, 20:7752 (R;US)
Use of interview and inquiry procedures in design process for NPP control room upgrade, 20:7733 (RA;XA)
Vol. 2: Experimental education methods, 20:9136 (I;CZ;In Czech)

REACTOR SAFETY
Improvement of Level-1 PSA computer code package -A study for nuclear safety improvement-, 20:9171 (R;KR;In Korean)
Manual of functions, assignments, and responsibilities for nuclear safety: Revision 2, 20:7783 (R;US)
Nordic nuclear safety research. Project plans for the 1994 - 1997 program, 20:7818 (R;DK;In Danish, Norwegian, English, Swed)
Nuclear power plant safety in the framework of future energy systems, 20:7782 (IA;CH)
Organizational factors and nuclear power plant safety, 20:7780 (R;US)
The safety of WWER and RBMK nuclear power plants. Progress report on the IAEA extrabudgetary programme on the safety of WWER and RBMK nuclear power plants, 1992-1994, 20:7653 (R;XA)

REACTOR SAFETY EXPERIMENTS
CORA results concerning LWR fuel element behaviour in the event of severe reactor accidents, 20:7793 (RA;DE;In German)
The FPT O experiment of the Phebus project, 20:7814 (RA;DE;In German)
Thermal hydraulic tests for reactor safety system -Research on the improvement of nuclear safety-, 20:7686 (R;KR;In Korean)

REACTOR SIMULATORS
Upgrade of one-dimensional core simulator ONED90, 20:7662 (R;KR;In Korean)

REACTOR SITES
Atmospheric dispersion estimates in the vicinity of buildings, 20:7760 (R;US)

REACTOR VESSELS
Intelligent control and automation technology for nuclear applications, 20:7695 (R;KR;In Korean)

REACTORS
See also BREEDER REACTORS
LIQUID METAL COOLED REACTORS
RESEARCH AND TEST REACTORS
WATER COOLED REACTORS
WATER MODERATED REACTORS
Nuclear data evaluation and group constant generation for reactor analysis, 20:9168 (R;KR;In Korean)

RECOMBINATION
Action of glow discharge on organic solids: primary radiation-chemical processes, formation of radical distribution, radical reactions and application., 20:8203 (IA;MX)

RECORDS RETRIEVAL
See INFORMATION RETRIEVAL

RECOVERY (TRITIUM)
See TRITIUM RECOVERY

REDMUD EVENT
See NUCLEAR EXPLOSIONS
UNDERGROUND EXPLOSIONS

REFRIGERANTS
A CO_2 vapour compression system for vehicle air conditioning, 20:8015 (RA;US)
Air cycle air conditioning and the use of ammonia in supermarket refrigeration systems, 20:8005 (RA;US)
Application of "natural" refrigerants: New system concepts for the use of CO_2, 20:8016 (RA;US)
CFC- and FHC-free refrigerators by FORON Hausgeraete Co. - a breakthrough in household refrigeration, 20:8002 (RA;US)
Flammable refrigerants in household refrigerators, 20:8004 (RA;US)
Materials compatibility and lubricants research on CFC-refrigerant substitutes. Quarterly MCLR program technical progress report, 1 July 1994–30 September 1994, 20:8432 (R;US)
Sealed tube comparisons of the compatibility of desiccants with refrigerants and lubricants. Quarterly technical progress report, July 1994–September 1994, 20:7962 (R;US)
The conversion of German household-appliance refrigeration industry from CFC's to hydrocarbons and fluorocarbons in 1993, 20:8003 (RA;US)
Thermoacoustic refrigeration and acoustic compression, 20:7998 (RA;US)
Water as refrigerant and secondary refrigerant: Technologies for the production of chilled water and ice-slurries, 20:7999 (RA;US)

REFRIGERATING MACHINERY
Absorption technology, 20:7994 (RA;US)
Air cycle air conditioning and the use of ammonia in supermarket refrigeration systems, 20:8005 (RA;US)
Thermoacoustic refrigeration and acoustic compression, 20:7998 (RA;US)
Water as refrigerant and secondary refrigerant: Technologies for the production of chilled water and ice-slurries, 20:7999 (RA;US)

REFRIGERATORS
AURA™: A fiberglass based vacuum insulation panel technology, 20:7993 (RA;US)
Aerogels - a foam alternative, 20:7991 (RA;US)
CFC- and FHC-free refrigerators by FORON Hausgeraete Co. - a breakthrough in household refrigeration, 20:8002 (RA;US)
Cooling and air conditioning with water/zeolite, 20:7996 (RA;US)
Cyclopentane as blowing agent for rigid polyurethane foam in refrigerator insulation, 20:8035 (RA;US)
Development of evacuated panel thermal insulations, 20:7990 (RA;US)
Flammable refrigerants in household refrigerators, 20:8004 (RA;US)
Natures refrigerant - propane, 20:8006 (RA;US)
Stirling cycle refrigerators and heat pumps, 20:7997 (RA;US)
Swiss Eco Refrigerator Project, 20:7988 (RA;US)
The conversion of German household-appliance refrigeration industry from CFC's to hydrocarbons and fluorocarbons in 1993, 20:8003 (RA;US)
Thermoacoustic refrigeration and acoustic compression, 20:7998 (RA;US)
Vacuum Insulation Panels (VIPs), 20:7992 (RA;US)

REFUSE
See SOLID WASTES

REFUSE DERIVED FUELS
Co-firing high sulfur coal with refuse derived fuels. Technical progress report No. 1, [September–November 1994], 20:7179 (R;US)
REFUSE-FUELED POWER PLANTS
Methane recovery from animal manures: A current opportunities casebook, 20:7552 (R;US)
REGGE TRAJECTORIES
On perturbative asymptotic of Regge trajectories, 20:8725 (R;XA)
REGION I
See USA
REGION II
See USA
REGION III
See USA
REGION IV
See USA
REGION IX
See USA
REGION V
See USA
REGION VI
See USA
REGION VII
See USA
REGION VIII
See USA
REGION X
See USA
REGULATIONS
See also POLLUTION REGULATIONS
Selected legal documents in the field of peaceful uses of nuclear energy in the Czech Republic, 20:7882 (I;CZ;In Czech)
REGULATORY GUIDES
Budget estimates - fiscal years 1996-1997, 20:7682 (R;US)
REINDEER
See DEER
RELATIVITY THEORY
Einstein's Length Concept, 20:8658 (R;XJ;In Russian)
Simultaneity and Length of the Moving Rod, 20:8659 (R;XJ;In Russian)
The Radiation Conditioned by the 'Velocity Part' of the Electromagnetic Field of a Moving Charge, 20:8656 (R;XJ)
RELEASE (FISSION PRODUCT)
See FISSION PRODUCT RELEASE
REMEDIAL ACTION
Appropriate Technology
Environmental Restoration Program technology baseline plan, 20:7472 (R;US)
Demonstration Programs
Cone penetrometer testing at the Hanford Site: Final performance evaluation report, 20:7490 (R;US)
Electrodynamics
In situ electrokinetic control of moisture and nutrients in unsaturated soils, 20:7488 (R;US)
Evaluation
Environmental analysis of Lower Pueblo/Lower Los Alamos Canyon, Los Alamos, New Mexico, 20:7477 (R;US)
Feasibility Studies
Demonstration testing and evaluation of in situ soil heating. Health and safety plan (Revision 2), 20:7302 (R;US)
Demonstration testing and evaluation of in situ soil heating. Treatability study work plan (Revision 2), 20:7301 (R;US)
Health Hazards
Environmental Hazards Assessment Program. Quarterly report, October–December 1994, 20:7853 (R;US)
Information Systems
Environmental Restoration Information Resource Management Program Plan, 20:7474 (R;US)
Legislation
International comparison of environmental protection provisions in remedial actions on uranium mine and mill tailings, 20:8492 (IA;CZ;In German)
Mathematical Models
Methodology of model approaches to ground water reclamation at the Straz deposit, 20:8538 (IA;CZ;In Czech)
Planning
Addressing the environmental burden remained after uranium surveying, mining and milling, 20:7448 (IA;CZ;In Czech)
CsI(Tl) with photodiodes for identifying subsurface radionuclide contamination, 20:8409 (R;US)
Potential hydrologic characterization wells in Amargosa Valley, 20:8473 (R;US)
Tank Waste Remediation System tank waste pretreatment and vitrification process development testing requirements assessment, 20:7411 (R;US)
Quality Assurance
Quality assurance FY 1995 site support program plan WBS 6.7.2.5, 20:7424 (R;US)
R Codes
Development of risk-based computer models for deriving criteria on residual radioactivity and recycling, 20:7466 (R;US)
Risk Assessment
Environmental Hazards Assessment Program. Quarterly report, October–December 1994, 20:7853 (R;US)
Safety Standards
Demonstration testing and evaluation of in situ soil heating. Health and safety plan (Revision 2), 20:7302 (R;US)
Technology Assessment
Technology study of Gunite tank sludge mobilization at Oak Ridge National Laboratory, Oak Ridge, Tennessee, 20:7484 (R;US)
Uranium Mines
The mining Pribram in science and technology. Section O: Mining and the environment, 20:7446 (I;CZ;In Czech)
REMOTE AREAS
Wind technology development: Large and small turbines, 20:7620 (R;US)
REMOTE HANDLING
A feasibility study for a manufacturing technology deployment center, 20:8021 (R;US)
REMOTE HANDLING EQUIPMENT
See also MANIPULATORS
Design criteria for the light duty utility arm system end effectors, 20:7379 (R;US)
FY94 Office of Technology Development Mixed Waste Operations Robotics Demonstration, 20:7504 (R;US)
Interactive three dimensional simulation for generation of synthetical returns in remote handling assisted by computer, 20:8228 (R;FR;In French)
Storage options for Long Length Contaminated Equipment (LLCE) items, 20:7402 (R;US)
REMOTE SENSING
An overview of technology, equipment and applications, 20:7511 (R;US)
REMOTE VIEWING EQUIPMENT
Analysis of in-situ rock joint strength using digital borehole scanner images, 20:8651 (R;US)
REMOVAL (AFTER-HEAT)
See AFTER-HEAT REMOVAL
RENEWABLE ENERGY SOURCES
See also BIOMASS
GEOTHERMAL ENERGY
HYDROELECTRIC POWER
SOLAR ENERGY
WIND POWER
Biologically produced succinic acid: A new route to chemical intermediates, 20:7543 (R;US)
Clean fractionation of biomass, 20:7544 (R;US)
Renewable Energy Demonstration Project by the National Renewable Energy Laboratory and the General Services Administration, 20:7586 (R;US)
REPUBLIC OF KOREA
A study on the briquetting by improving the carbonization, 20:7142 (R;KR;In Korean)
Detailed survey of wind energy on Cheju Province for the feasibility study of wind farm(II), 20:7979 (R;KR;In Korean)

RESEARCH AND TEST REACTORS
See also RESEARCH REACTORS
TRIGA TYPE REACTORS
Instruction texts and problems for the training and examination of selected personnel at research nuclear facilities, 20:9135 (I;CZ;In Czech)
Postirradiation examination of a low enriched U_3Si_2-Al fuel element manufactured and irradiated at Batan, Indonesia, 20:7762 (R;US)
Vol. 1: Selected chapters in reactor theory, 20:7689 (I;CZ;In Czech)
Vol. 3: Research and experimental reactors, 20:7768 (I;CZ;In Czech)

RESEARCH PROGRAMS
Infrastructure support for the Waste Management Institute at North Carolina A&T State University. Progress report, September 1994–January 1995, 20:7307 (R;US)
Interim report of the Advisory Committee on human radiation experiments, 20:8606 (R;US)
New fusion research and development stage with an experimental reactor, 20:9113 (IA;DE)
Oak Ridge National Laboratory Core Competencies, 20:7876 (R;US)

RESEARCH REACTORS
See also BER-2 REACTOR
FFTF REACTOR
KMR REACTOR
PARR REACTOR
Combined calculation of in-pile experimental devices by the Monte Carlo method, 20:7688 (R;RU;In Russian)
Development of a new control software package for Pakistan Research Reactor-2, 20:7751 (R;PK)
Relative performance properties of the ORNL Advanced Neutron Source Reactor with reduced enrichment fuels, 20:7763 (R;US)

RESERVOIR ROCK
Predicting the transport properties of sedimentary rocks from microgeometry, 20:8647 (R;US)
The pre-calculation of ground subsidence due to extraction above petroleum and natural gas deposits, 20:7241 (R;DE;In German)

RESID
See PETROLEUM RESIDUES

RESIDENCES
See HOUSES

RESIDENTIAL BUILDINGS
See also APARTMENT BUILDINGS
HOUSES
Canadian R&D on oil-fired combustion systems, 20:7950 (RA;US)
Comparison of current state residential energy codes with the 1992 model energy code for one- and two-family dwellings; 1994, 20:8007 (R;US)
Final report, exhaust air heat pump monitoring study, 20:8019 (R;US)
Heat cost allocation in Finland, 20:7980 (R;FI;In Finnish)
Nitrogen oxides (NO_x) and oil burners, 20:7951 (RA;US)
Oil heat technology - efficiency training manual, 20:7948 (RA;US)
Part I - Oil heat technology research and development. Part II - NAECA 2002, what, when, and who?, 20:7947 (RA;US)
Possible future directions for extruded polystyrene foam insulation, 20:7987 (RA;US)
Residential fuel quality study (Part II), 20:7953 (RA;US)
Results of the validation of the oil heat vent analysis program (OHVAP), 20:7957 (RA;US)
Update on the build with oil program and the oilheat manufacturers association, 20:7949 (RA;US)

RESIDUAL OILS
See PETROLEUM RESIDUES

RESIDUAL STRESSES
Residual Stress Measurements with Laser Speckle Correlation Interferometry and Local Heat Treating, 20:7697 (R;US)

RESIDUES (RADIOACTIVE)
See RADIOACTIVE WASTES

RESINS
Refining of fossil resin flotation concentrate from western coal. Seventh quarter final report, July 1, 1994–September 30, 1994, 20:7146 (R;US)

RESISTAL
See COPPER BASE ALLOYS

RESONANCE CAVITIES
See CAVITY RESONATORS

RESONANCE ESCAPE PROBABILITY
Improvements in a four factor formula recipe for lattice calculations, 20:7687 (R;DK)

RESONANCE SCATTERING
Statistical properties of chaotic scattering with one open channel, 20:8660 (R;RU)

RESOURCE MANAGEMENT
Ocean Studies Board. Annual report 1992, 20:8529 (R;US)
Ocean Studies Board. Annual report 1993, 20:8528 (R;US)

RESOURCE RECOVERY ACTS
Ignitable, corrosive, reactive, and incompatible wastes information brief, 20:7851 (R;US)
Summary report of Hanford Site well remediation and decommissioning activities for fiscal year 1994, 20:7493 (R;US)

RESOURCES
See also WATER RESOURCES
A study on resources survey and characteristic of wastes in Korea(II), 20:8047 (R;KR;In Korean)

RESPIRATORY TRACT CELLS
Cellular morphometry and cycling cell populations of human and dog bronchi. Annual progress report, April 1, 1994–March 31, 1995, 20:8612 (R;US)

RETRIEVAL SYSTEMS
Parametric design using IGRIP, 20:7353 (R;US)

REVERSE-FIELD PINCH
Advances and prospects in reversed field pinch research, 20:9045 (R;US)
Transport reduction by current profile control in the reversed field pinch, 20:9044 (R;US)

REVERSED-FIELD PINCH DEVICES
Advances and prospects in reversed field pinch research, 20:9045 (R;US)

REZISTAL
See CHROMIUM ALLOYS
IRON BASE ALLOYS
NICKEL ALLOYS

RHO-1500 RESONANCES
See MESONS

RHO-1700 RESONANCES
See MESONS

RHO-765 RESONANCES
See RHO-770 MESONS

RHO-770 MESONS
Mixing phases of unstable two-level systems, 20:8847 (R;RU)

RIBONUCLEIC ACID
See RNA

RICHLAND FFTF REACTOR
See FFTF REACTOR

RIEHL-SCHON MODEL
See CRYSTALS

RILEY-MORGAN PROCESS
See COAL GASIFICATION

RINGS (STORAGE)
See STORAGE RINGS

RISER CRACKING
See COAL LIQUEFACTION

RISK ANALYSIS
See RISK ASSESSMENT

RISK ASSESSMENT
Ecological risk assessment benefits environmental management, 20:7866 (R;US)
Using knowledge based systems for rams analysis and on-line operator support of nuclear power plants, 20:7740 (RA;XA)

RISOE NATIONAL LABORATORY
Three-year plan (1995-1997) for the activities of Risoe National Laboratory, 20:7879 (R;DK;In Danish)

RIVERS
See also CLINCH RIVER
COLUMBIA RIVER
NIGER RIVER
The use of nuclear techniques in hydrosedimentology: Principle and application in Mali, 20:8534 (RA;XA;In French)

RIVETS
See FASTENERS

RNA
Can we estimate bacterial growth rates from ribosomal RNA content?, 20:8595 (R;US)
Determination of architectural elements of RNA structure, 20:8558 (RA;US)
Evolution on fitness landscapes, 20:8566 (RA;US)
Syntheses of nucleic acid and protein in somatic embryos of Fritillaria ussuriensis maxim in different development stages, 20:8596 (R;CN)

ROADS
Final report on Thermally Modified Sand demonstration project, 20:8042 (R;US)

ROBOTS
Autonomous mobile robot for radiologic surveys, 20:8241 (PA;US)
FY94 Office of Technology Development Mixed Waste Operations Robotics Demonstration, 20:7504 (R;US)
Intelligent control and automation technology for nuclear applications, 20:7748 (R;KR;In Korean)
The development of advanced robotic technology -The development of advanced robotics for the nuclear industry-, 20:8235 (R;KR;In Korean)
The development of advanced robotics for the nuclear industry, 20:8230 (R;KR;In Korean)

ROCK SALT
See SALT DEPOSITS

ROCKGAS PROCESS
See COAL GASIFICATION

ROCKY MOUNTAIN REGION
See USA

RODS (CONTROL)
See CONTROL ELEMENTS

RODS (FUEL)
See FUEL RODS

ROMBACH PROCESS
See COAL GASIFICATION

ROMEO EVENT
See NUCLEAR EXPLOSIONS

ROOFS
Load test of the 277W Building high bay roof deck and support structure, 20:7494 (R;US)

ROTATING PLASMA
Energy spectra of charge-exchange atoms from a rotating plasma, 20:9067 (R;RU;In Russian)

RULISON EVENT
See NUCLEAR EXPLOSIONS
UNDERGROUND EXPLOSIONS

RUSSIAN FEDERATION
Development of analytical and numerical models for the assessment and interpretation of hydrogeological field tests, 20:7326 (R;US)
Radioactive waste in the Russian Federation, 20:7362 (R;SE)
Russian prospects for plutonium accumulation and utilization, 20:7271 (RA;XA)
Utilization in BN-800 fast reactors of isolated plutonium being accumulated in the Russian Federation, 20:7272 (RA;XA)

RUTHENIUM OXIDES
Microstructure and composition of a SNS Josephson junction using $CaRuO_3$ as the metallic barrier, 20:9026 (R;US)

S

S CODES
SALOME. Software for the analysis of lines or multiplets from Extrap. User's guide, 20:9175 (R;SE)

S WAVES
A new set of average level spacings for s-wave resonance, 20:8852 (RA;CN)

S-1000 RESONANCES
See MESONS

SAFETY
See also OCCUPATIONAL SAFETY
REACTOR SAFETY
Development of accident management technology and computer codes -A study for nuclear safety improvement-, 20:9170 (R;KR;In Korean)
Representation of topological and functional-logical knowledge in an expert system for probabilistic safety analysis, 20:7642 (RA;XA)
Research on the improvement of nuclear safety, 20:7656 (R;KR;In Korean)

SAFETY (NUCLEAR)
See RADIATION PROTECTION

SAFETY (REACTOR)
See REACTOR SAFETY

SAFETY REPORTS
The development of integrated safety assessment technology, 20:7657 (R;KR;In Korean)

SALMON
Evaluation of juvenile fish bypass and adult fish passage facilities at water diversions in the Umatilla River. Annual and interim progress report, October 1990–September 1991, 20:7573 (R;US)
Significance of selective predation and development of prey protection measures for juvenile salmonids in the Columbia and Snake River Reservoirs. Annual report, February 1992–February 1993, 20:7577 (R;US)
Umatilla hatchery monitoring and evaluation. Annual report 1993, September 1, 1992–October 30, 1993, 20:7576 (R;US)

SALT CAVERNS
Calculation of the radiation transport in rock salt using Monte Carlo methods. Final report. HAW project, 20:7314 (R;DE)

SALT DEPOSITS
Supai salt karst features: Holbrook Basin, Arizona, 20:7246 (R;US)

SALTS
Development of industrial waste heat recovery system using chemical heat pump with NH_3-salt(I), 20:7971 (R;KR;In Korean)

SAMARIUM 147
Neutron resonance spin determination by the shape of capture gamma-quanta multiplicity spectrum, 20:8854 (R;RU;In Russian)

SAMARIUM 147 TARGET
Neutron resonance spin determination by the shape of capture gamma-quanta multiplicity spectrum, 20:8854 (R;RU;In Russian)

SAMPLERS
Test report – Prototype core sampler, 20:7421 (R;US)
The application of borehole logging to characterize the hydrogeology of the Faultless site, Central Nevada Test Area, 20:8472 (R;US)

SAMPLING
Quality Assurance Project Plan for Facility Effluent Monitoring Plan activities, 20:8518 (R;US)

SAN JUAN POWER PLANT
See FOSSIL-FUEL POWER PLANTS

SAND
Final report on Thermally Modified Sand demonstration project, 20:8042 (R;US)

SANDIA LABORATORIES
Pollution prevention opportunity assessment for Building 922 solid office waste, 20:7356 (R;US)
Pollution prevention opportunity assessment for the SNL/California waste management facilities, 20:7357 (R;US)

SANDIA NATIONAL LABORATORIES
See also SANDIA LABORATORIES
Alternative futures for the Department of Energy National Laboratories, 20:7881 (R;US)

Physical and Chemical Sciences Center: Research briefs. Volume 9-94, 20:7880 (R;US)

SANDSTONES
An experimental and theoretical study to relate uncommon rock/fluid properties to oil recovery. Quarterly report, July 1, 1993–September 30, 1993, 20:7189 (R;US)
Geological and petrophysical characterization of the Ferron Sandstone for 3-D simulation of a fluvial-deltaic reservoir. Quarterly report, July 1–September 30, 1994, 20:7192 (R;US)

SANITARY LANDFILLS
Optimization of biogas recovery by controlled deposition of solid waste. Status report 4, 20:7562 (R;SE;In Swedish)
Reactive liquid/liquid extraction of heavy metals from landfill seepage waters. Its characterisation and application, 20:8542 (R;DE;In German)

SATELLITES
Radiation tolerance of the Offec Leo satellites. Design-policy, ground testing and flight data evaluation, 20:8408 (RA;IL)

SAVANNAH RIVER PLANT
200 Area weekly report, 20:7310 (R;US)
200 Area weekly report, 20:7308 (R;US)
200 Area weekly report, 20:7309 (R;US)
Characterization of high-level waste saltcake stored at the Savannah River Site, 20:7425 (R;US)
Deflagration-induced pressure and temperature transients in a waste storage facility, 20:7427 (R;US)
Department of Energy Plutonium ES&H Vulnerability Assessment Savannah River Site interim compensatory measures, 20:7286 (R;US)
High-level waste management technology program plan, 20:7315 (R;US)
Metallurgical Laboratory Hazardous Waste Management Facility groundwater monitoring report. Third quarter, 1994, 20:7463 (R;US)
Nuclear criticality safety evaluation – DWPF Late Wash Facility, Salt Process Cell and Chemical Process Cell, 20:8227 (R;US)
Passive control of VOCs using valved well heads: FY1994 report, 20:7508 (R;US)
Savannah River Technology Center monthly report: August 1994, 20:7261 (R;US)
Savannah River Technology Center monthly report: June 1994, 20:7260 (R;US)
Six-phase soil heating for enhanced removal of contaminants: Volatile organic compounds in non-arid soils integrated demonstration, Savannah River Site, 20:7486 (R;US)
The stainless steel beneficial reuse integrated demonstration, 20:7428 (R;US)
Thirty-Year Solid Waste Generation Forecast by Treatability Group, 20:7461 (R;US)
Thirty-Year Solid Waste Generation Maximum and Minimum Forecast for SRS, 20:7462 (R;US)

SCALAR FIELDS
Large Scale Periodicity of the Universe and Baryogenesis, 20:8730 (R;XJ)
Resonant re-formation of the vacuum, 20:8722 (R;XA)

SCALAR MESONS
Multichannel Resonances in Coupled Channels of Meson Scattering: Scalar Sector, 20:8836 (R;XJ;In Russian)

SCALE MODELS
Test of a conceptual prototype of the total internal reflection Cherenkov imaging detector (DIRC) with cosmic muons, 20:8401 (R;US)
The STAR EM calorimeter design and small prototype test results, 20:8339 (R;US)

SCANDINAVIA
See also DENMARK
FINLAND
NORWAY
SWEDEN
Nordic nuclear safety research. Project plans for the 1994 - 1997 program, 20:7818 (R;DK;In Danish, Norwegian, English, Swed)

SCATTERING AMPLITUDES
Determination of scattering amplitudes from differential cross section data by using unitarity conditions, 20:8878 (R;AU)

SCHMALFELDT-WINTERSHALL PROCESS
See COAL GASIFICATION

SCHOOL BUILDINGS
Results of actions to reduce the amount of radon in the town of Jachymov. The nursery school building, 20:8494 (IA;CZ;In Czech)
Study on the environment of passive solar schoolrooms (II), 20:7972 (R;KR;In Korean)

SCHOOL FACILITIES
See EDUCATIONAL FACILITIES

SCHOOL PLANT
See EDUCATIONAL FACILITIES

SCHOOLS
See EDUCATIONAL FACILITIES

SCHWINGER-TOMONAGA FORMALISM
Properties of a multichannel resonant-level model, 20:9039 (R;XA)

SCINTILLATOR-PHOTODIODE DETECTORS
CsI(Tl) with photodiodes for identifying subsurface radionuclide contamination, 20:8409 (R;US)

SCOTCH EVENT
See NUCLEAR EXPLOSIONS
UNDERGROUND EXPLOSIONS

SCOTLAND
See UNITED KINGDOM

SCRAP METALS
The stainless steel beneficial reuse integrated demonstration, 20:7428 (R;US)

SCREWS
See FASTENERS

SCRUBBERS
Trace species removal for fuel cell application, 20:7931 (RA;US)

SEA DISPOSAL
See MARINE DISPOSAL

SEALING MATERIALS
Sealant materials for the solid oxide fuel cell, 20:7930 (RA;US)

SEALS
Pitting corrosion of aluminized seals in molten carbonate fuel cells, 20:7928 (RA;US)

SEAS
See also BALTIC SEA
Eutrophication of soil, fresh water and the sea, 20:8516 (R;SE)
Ocean Studies Board. Annual report 1992, 20:8529 (R;US)
Ocean Studies Board. Annual report 1993, 20:8528 (R;US)
Onset time and strength of oceanic deep convection diagnosed from an ocean large-eddy simulation model, 20:8546 (R;US)

SEASONAL THERMAL ENERGY STORAGE
Simulation of diurnal thermal energy storage systems: Preliminary results, 20:7600 (R;US)

SEASONINGS
See FOOD

SEAWATER
Handbook of methods for the analysis of the various parameters of the carbon dioxide system in sea water. Version 2, 20:8544 (R;US)

SECOND-HARMONIC GENERATION
See HARMONIC GENERATION

SECONDARY BATTERIES
See ELECTRIC BATTERIES

SECONDARY COOLANT CIRCUITS
A study on the computerization of secondary side on-line chemistry monitoring system of PWR, 20:7661 (R;KR;In Korean)

SECONDARY EMISSION
The forbidden angular region of secondary particle emission in the laboratory system, 20:8872 (RA;CN)

SECONDARY RECOVERY
See ENHANCED RECOVERY

SECURITY
Director's series on proliferation, 20:8068 (R;US)

SEDIMENT BASINS
See SETTLING PONDS

SEDIMENTARY ROCKS
See also SANDSTONES

Predicting the transport properties of sedimentary rocks from microgeometry, 20:8647 (R;US)

SEDIMENTS
Data summary for the near-shore sediment characterization task of the Clinch River Environmental Restoration Program, 20:7483 (R;US)
Density-driven displacement of pore water as possible factor affecting the vertical distribution of Chernobyl-derived radionuclides in a Baltic Sea sediment, 20:8547 (R;SE)
FY 1995 Remedial Investigation Work Plan for Waste Area Grouping 2 at Oak Ridge National Laboratory, Oak Ridge, Tennessee, 20:7298 (R;US)
In situ measurements of suspended sediment transport in the wadi dourou ("pays Dogon" - Mali), 20:8487 (RA;XA;In French)
Inventory and sensitivity mapping in the German Wadden Sea. June 1987 - June 1993. Final report, 20:8530 (R;DE;In German)
Overview of results of a detailed survey of contamination of the Ploucnice flood plain, 20:8537 (IA;CZ;In Czech)
Release of dinitrous oxide from intertidal sediments - illustrated by the example of the Elbe estuary (Muehlenberger Loch) and coastal tidal region (Koenigshafen/Sylt), 20:8447 (R;DE;In German)
The use of nuclear techniques in hydrosedimentology: Principle and application in Mali, 20:8534 (RA;XA;In French)

SEISMICITY
Seismic monitoring at the Geysers Geothermal Field, 20:7605 (R;US)

SELF-POWERED GAMMA DETECTORS
The Radiation Monitor (RAM-R) system, 20:8354 (RA;IL)

SELOX PROCESS
See COAL GASIFICATION

SEMICLASSICAL APPROXIMATION
Quasi-Classical Description of Heavy Ion Reactions, 20:8876 (R;XJ)

SEMICONDUCTOR DEVICES
See also SEMICONDUCTOR LASERS
Particle transport in plasma reactors, 20:8149 (R;US)
Track effects and their influence on heavy ion energy losses in semiconductor devices, 20:8405 (RA;IL)

SEMICONDUCTOR LASERS
Electron-optical nonlinear interaction in asymmetric quantum-well laser heterostructures, 20:8694 (R;XA)
Visible light emitting vertical cavity surface emitting lasers, 20:8272 (PA;US)

SEMICONDUCTOR MATERIALS
Acoustomagnetoelectric effect in a superlattice, 20:8696 (R;XA)
The model of radiation-induced crystallization and amorphous layer growth in semiconductors under light ion irradiation, 20:8092 (IA;RU;In Russian)

SEMILEPTONIC DECAY
B to D and D to K semileptonic weak decay form factors, 20:8795 (IA;IR;In English, Persian)
Measurement of the semi-leptonic branching ratio and the baryonic contribution in b quark disintegrations, 20:8837 (R;FR;In French)

SENIOR CENTERS
See PUBLIC BUILDINGS

SEPARATION EQUIPMENT
A simulated countercurrent moving-bed chromatographic reactor for the oxidative coupling of methane: Experimental results, 20:7571 (R;US)
Experimental Study of Particle Separation in a L Kr Ionization Chamber by Multiple Measuring of dE/d x Using the Shape Analysis of Signal (L Kr (Liquid Krypton).), 20:8377 (R;XJ)

SEPARATION PROCESSES
See also FLOTATION
ISOTOPE SEPARATION
Savannah River Technology Center monthly report: August 1994, 20:7261 (R;US)
Savannah River Technology Center monthly report: June 1994, 20:7260 (R;US)

SERI
See NATIONAL RENEWABLE ENERGY LABORATORY

SERUM (BLOOD)
See BLOOD SERUM

SETTLING PONDS
The cascade of reservoirs of the "Mayak" Plant: Case history and the first version of a computer simulator, 20:7479 (R;US)

SEWAGE SLUDGE
Sewage sludge pyrolysis/conversion: disposal of sewage sludge with the production of oils. Final report, 20:8046 (R;DE;In German)

SHIPMENT
See TRANSPORT

SHIPPINGPORT PRESSURIZED WATER REACTOR
See SHIPPINGPORT REACTOR

SHIPPINGPORT REACTOR
Evaluation of storing Shippingport Core II spent blanket fuel assemblies in the T Plant PWR Core II fuel pool without active cooling, 20:7666 (R;US)

SHOWER COUNTERS
Beam tests of 'Spacal' type modules for a high pressure gas calorimeter, 20:8370 (R;RU)
Support girder design for the atlas hadron calorimeter, 20:8341 (R;US)
Test of an array of CsI(Tl) crystal towers for a low or medium energy e^+e^- collider calorimeter, 20:8400 (R;US)
The STAR EM calorimeter design and small prototype test results, 20:8339 (R;US)
Thermal effects on the STAR electromagnetic calorimeter, 20:8340 (R;US)

SI SEMICONDUCTOR DETECTORS
See also LI-DRIFTED SI DETECTORS
Charged particle detectors based on high quality amorphous silicon deposited with hydrogen or helium dilution of silane, 20:8393 (R;US)
Investigation of Silicon Planar Detectors for LHC project (LHC (Large Hadron Collider).), 20:8378 (R;XJ)
JINR rapid communications. Collection 5, 20:7685 (R;XJ;In English, Russian)

SIALON
See ALUMINIUM OXIDES
SILICON NITRIDES

SICHROMAL ALLOYS
See ALUMINIUM ALLOYS
CHROMIUM ALLOYS
IRON BASE ALLOYS

SILICA GEL
Aerogels - a foam alternative, 20:7991 (RA;US)
Development of evacuated panel thermal insulations, 20:7990 (RA;US)
On Optical Transition Radiation of Charged Particles in SiO_2-Aerogels, 20:9010 (R;XJ;In Russian)
Vacuum Insulation Panels (VIPs), 20:7992 (RA;US)

SILICEOUS ROCK
See SANDSTONES

SILICIC ACID ESTERS
See ORGANIC SILICON COMPOUNDS

SILICON
Annealing
Modification of properties in proton implanted silicon under heat treatment, 20:8094 (IA;RU;In Russian)
Antireflection Coatings
Silicon surface and bulk defect passivation by low temperature PECVD oxides and nitrides, 20:7587 (R;US)
Crystal Doping
Photonuclear transmutation alloying of silicon monocrystals with aluminium, 20:9007 (IA;RU;In Russian)
Crystal-Phase Transformations
On the temperature dependence of critical dose of silicon crystal-amorphous state transformation under ion implantation, 20:8998 (IA;RU;In Russian)
Current Density
Silicon surface and bulk defect passivation by low temperature PECVD oxides and nitrides, 20:7587 (R;US)

Electrochemical Coating
Non-destructive characterization of porous silicon using X-ray reflectivity, 20:8145 (R;US)
Electronic Structure
Inelastic plasmon and inter-band electron-scattering potentials for Si from dielectric matrix calculations, 20:9016 (R;AU)
Growth
Float zone silicon sheet growth. Quarterly technical progress report No. 5, October 1, 1994–December 31, 1994, 20:8141 (R;US)
Heat Flux
Cryogenic monochromator as a solution to undulator heat loads at third generation synchrotron sources, 20:8309 (R;US)
Inelastic Scattering
Inelastic plasmon and inter-band electron-scattering potentials for Si from dielectric matrix calculations, 20:9016 (R;AU)
Ion Implantation
Boron-nitrogen interaction in silicon durins a silicon nitrogen structure formation under N^+ ion implantation, 20:9000 (IA;RU;In Russian)
Modification of properties in proton implanted silicon under heat treatment, 20:8094 (IA;RU;In Russian)
On the temperature dependence of critical dose of silicon crystal-amorphous state transformation under ion implantation, 20:8998 (IA;RU;In Russian)
Structure changing and impurity behaviour in silicon under phosphorus 'hot' implantation and annealing, 20:8996 (IA;RU;In Russian)
Study of SiO_2-Si structure implanted by antimony ions, 20:9001 (IA;RU;In Russian)
Nondestructive Testing
Non-destructive characterization of porous silicon using X-ray reflectivity, 20:8145 (R;US)
Passivation
Silicon surface and bulk defect passivation by low temperature PECVD oxides and nitrides, 20:7587 (R;US)
Physical Radiation Effects
Photonuclear transmutation alloying of silicon monocrystals with aluminium, 20:9007 (IA;RU;In Russian)
Recombination
Back surface cell structures for reducing recombination in CZ silicon solar cells, 20:7594 (R;US)
Extraction of the surface recombination velocity of passivated phosphorus-doped silicon emitters, 20:7590 (R;US)
Spray Coating
Method of fabricating silicon carbide coatings on graphite surfaces, 20:8129 (PA;US)
Surface Properties
Extraction of the surface recombination velocity of passivated phosphorus-doped silicon emitters, 20:7590 (R;US)
Non-destructive characterization of porous silicon using X-ray reflectivity, 20:8145 (R;US)
Structural alloy with a protective coating containing silicon or silicon-oxide, 20:8104 (PA;US)
Thermal Stresses
Cryogenic monochromator as a solution to undulator heat loads at third generation synchrotron sources, 20:8309 (R;US)

SILICON CARBIDES
High performance materials in coal conversion utilization. Technical progress report, July 1–September 30, 1994, 20:8140 (R;US)
Strength and elastic properties of some graphites, carbon/carbon and SiC/SiC composite materials, 20:8142 (R;DE;In German)

SILICON NITRIDES
Feasibility of ceramic joining with high energy electron beams, 20:8130 (R;US)
Silicon surface and bulk defect passivation by low temperature PECVD oxides and nitrides, 20:7587 (R;US)

SILICON OXIDES
A solubility model for amorphous silica in concentrated electrolytes, 20:8192 (R;US)
Silicon surface and bulk defect passivation by low temperature PECVD oxides and nitrides, 20:7587 (R;US)
Study of SiO_2-Si structure implanted by antimony ions, 20:9001 (IA;RU;In Russian)

SILICON SEMICONDUCTOR DETECTORS
See SI SEMICONDUCTOR DETECTORS

SILICON SOLAR CELLS
A statistical analysis of the effect of PECVD deposition parameters on surface and bulk recombination in silicon solar cells, 20:7588 (R;US)
Back surface cell structures for reducing recombination in CZ silicon solar cells, 20:7594 (R;US)
Rapid thermal processing of high-efficiency silicon solar cells with controlled in-situ annealing, 20:7595 (R;US)
Silicon surface and bulk defect passivation by low temperature PECVD oxides and nitrides, 20:7587 (R;US)
Spectral response of a polycrystalline silicon solar cell, 20:8994 (R;XA)
The effect of encapsulation on the reflectance of photovoltaic modules using textured multicrystalline-silicon solar cells, 20:7592 (R;US)

SIMPLEX PROCESS
See COAL GASIFICATION

SIMULATORS
See also REACTOR SIMULATORS
Virtual reality and stereoscopic telepresence, 20:7491 (R;US)

SIMULATORS (REACTOR)
See REACTOR SIMULATORS

SIREDON
See AXOLOTL

SITE CHARACTERIZATION
Aggradational and erosional history of the Radioactive Waste Management Complex at the Idaho National Engineering Laboratory, 20:7311 (R;US)
Fall 1994 wildlife and vegetation survey, Norton Air Force Base, California, 20:8511 (R;US)

SITE REHABILITATION
See REMEDIAL ACTION

SITE SURVEYS
See SITE CHARACTERIZATION

SITES (REACTOR)
See REACTOR SITES

SKYLIGHTS
Renewable Energy Demonstration Project by the National Renewable Energy Laboratory and the General Services Administration, 20:7586 (R;US)

SKYRMIONS
See SOLITONS

SLIGHTLY ENRICHED URANIUM
Radiological effects of an aircraft crash into the BER II research reactor. Comparison of effects for HEU and LEU fuels, 20:7785 (R;DE;In German)

SLOVAK REPUBLIC
See SLOVAKIA

SLOVAKIA
Wind energy market study Eastern Europe. Czech and Slovak Republics, 20:7609 (R;DK)

SLUDGES
See also SEWAGE SLUDGE
183-H basin sludge treatability testing program plan, 20:7384 (R;US)
Analysis of glycerin waste in A-Area sanitary treatment facility material, 20:7436 (R;US)
Criticality safety evaluation report for the 100 KE Basin sandfilter backwash pit, 20:7375 (R;US)
K Basin spent fuel sludge treatment alternatives study. Volume 1, Regulatory options, 20:7343 (R;US)
Technology study of Gunite tank sludge mobilization at Oak Ridge National Laboratory, Oak Ridge, Tennessee, 20:7484 (R;US)
The solubility of $Cr(OH)_3$(am) in concentrated NaOH and NaOH-$NaNO_3$ solutions, 20:7349 (R;US)
Vitrification Studies with DOE Low-Level Mixed Waste Wastewater Treatment Sludges, 20:7429 (R;US)

SLUGS (FUEL)
See FUEL RODS

SLURRIES
See also FUEL SLURRIES
Melter feed tank operating map from the FA-10.02 test data, 20:7434 (R;US)
SLURRIES (FUEL)
See FUEL SLURRIES
SMALL ANGLE SCATTERING
Optical model parameters and fast neutron small angles scattering cross sections, 20:8898 (RA;CN)
Small Angle Neutron Scattering Facility for Low and High Power Reactors, 20:8947 (R;XJ)
SMALL BUSINESSES
Forecast of Contracting and Subcontracting Opportunities, Fiscal year 1995, 20:7870 (R;US)
SMALL-SCALE HYDROELECTRIC POWER PLANTS
A study on the optimum operation methodology of small hydro power plants(I), 20:7978 (R;KR;In Korean)
SMARTOR DEVICE
See TOKAMAK DEVICES
SMES
See SUPERCONDUCTING MAGNETIC ENERGY STORAGE
SMOKY EVENT
See NUCLEAR EXPLOSIONS
SODIUM
Determination of micro-amount carbon in sodium metal by vacuum distillation-gas chromatography, 20:8152 (R;CN;In Chinese)
Electron-atom collision studies using optically state selected beams. Progress report, May 15, 1988–May 14, 1991, 20:8960 (R;US)
Electron-atom collision studies using optically state selected beams. Progress report, May 15, 1987–May 14, 1988, 20:8959 (R;US)
Evaluation of neutron nuclear data of sodium, 20:8883 (RA;CN)
SODIUM BROMIDES
The one-dimensional model of the off-centre potential of the fluorine ion in the NaBr lattice, 20:8978 (R;XA)
SODIUM CHLORIDES
Final report on Thermally Modified Sand demonstration project, 20:8042 (R;US)
SODIUM CITRATES
See SODIUM COMPOUNDS
SODIUM COMPOUNDS
See also SODIUM BROMIDES
SODIUM CHLORIDES
SODIUM HYDROXIDES
SODIUM NITRATES
Effect of He pressure on the superconducting transition temperatures of Na_2CsC_{60} and $(NH_3)_4Na_2CsC_{60}$, 20:8147 (R;US)
Salt splitting of sodium-dominated radioactive waste using ceramic membranes, 20:7347 (R;US)
SODIUM HYDROXIDES
The solubility of $Cr(OH)_3(am)$ in concentrated NaOH and NaOH-$NaNO_3$ solutions, 20:7349 (R;US)
SODIUM IODIDE DETECTORS
See NAI DETECTORS
SODIUM LAURYL SULFATES
See SODIUM COMPOUNDS
SODIUM MINERALS
See MINERALS
SODIUM NITRATES
The solubility of $Cr(OH)_3(am)$ in concentrated NaOH and NaOH-$NaNO_3$ solutions, 20:7349 (R;US)
SODIUM PHOSPHIDES
See SODIUM COMPOUNDS
SODIUM-WATER REACTIONS
See MOLTEN METAL-WATER REACTIONS
SOFC
See SOLID ELECTROLYTE FUEL CELLS
SOILS
Chemical Analysis
High explosive spot test analyses of samples from Operable Unit (OU) 1111, 20:8497 (R;US)
Compacting
Soil weight (lbf/ft^3) at Hanford waste storage locations (2 volumes), 20:7409 (R;US)
Contamination
An assessment of high-energy explosives and metal contamination in soil at TA-67 (12), L-Site, and TA-14, Q-Site, 20:8420 (R;US)
FY 1995 Remedial Investigation Work Plan for Waste Area Grouping 2 at Oak Ridge National Laboratory, Oak Ridge, Tennessee, 20:7298 (R;US)
High explosive spot test analyses of samples from Operable Unit (OU) 1111, 20:8497 (R;US)
Passive control of VOCs using valved well heads: FY1994 report, 20:7508 (R;US)
Sampling and analysis of soil from the old F-Area effluent ditch and its surrounding wetlands, 20:7435 (R;US)
Toxicological benchmarks for screening potential contaminants of concern for effects on soil and litter invertebrates and heterotrophic process, 20:8642 (R;US)
Uranium-contaminated soils: Ultramicrotomy and electron beam analysis, 20:7441 (R;US)
Decontamination
Demonstration testing and evaluation of in situ soil heating. Health and safety plan (Revision 2), 20:7302 (R;US)
Demonstration testing and evaluation of in situ soil heating. Treatability study work plan (Revision 2), 20:7301 (R;US)
Limited field investigation report for the 100-KR-1 operable unit, 20:7304 (R;US)
Dose Rates
Measuring program of the Federal Republic of Germany. Results of environmental measurement in Russia, Byelorussia and Ukraine in the time from May 17 to September 2, 1993, and from October 8 to November 1, 1993, 20:8496 (R;DE;In German)
Emanation Thermal Analysis
Application of gas geochemistry in the search for different types of uranium deposits. Final report for the period 15 November 1991 - 15 March 1994, 20:7262 (R;XA)
Eutrophication
Eutrophication of soil, fresh water and the sea, 20:8516 (R;SE)
Gas Analysis
Application of gas geochemistry in the search for different types of uranium deposits. Final report for the period 15 November 1991 - 15 March 1994, 20:7262 (R;XA)
Heating
Demonstration testing and evaluation of in situ soil heating. Health and safety plan (Revision 2), 20:7302 (R;US)
Demonstration testing and evaluation of in situ soil heating. Treatability study work plan (Revision 2), 20:7301 (R;US)
Moisture
Calibration of neutron moisture gauges and their ability to spatially determine soil water content in environmental studies, 20:8238 (R;US)
Physical Properties
Soil weight (lbf/ft^3) at Hanford waste storage locations (2 volumes), 20:7409 (R;US)
Quantitative Chemical Analysis
An assessment of high-energy explosives and metal contamination in soil at TA-67 (12), L-Site, and TA-14, Q-Site, 20:8420 (R;US)
Radionuclide Migration
A brief review of environmental transport of tritium at the Los Alamos LLRW disposal facility, 20:8498 (R;US)
A survey of existing and emerging technologies for external detection of liquid leaks at the Hanford Site, 20:7340 (R;US)
Remedial Action
Cone penetrometer testing at the Hanford Site: Final performance evaluation report, 20:7490 (R;US)
Derivation of uranium residual radioactive material guidelines for the 4400 Piehl Road Site, Ottawa Lake, Michigan, 20:7467 (R;US)
In situ electrokinetic control of moisture and nutrients in unsaturated soils, 20:7488 (R;US)
Limited field investigation report for the 100-KR-1 operable unit, 20:7304 (R;US)

Six-phase soil heating for enhanced removal of contaminants: Volatile organic compounds in non-arid soils integrated demonstration, Savannah River Site, 20:7486 (R;US)
Soil treatment to remove uranium and related mixed radioactive heavy metal contaminants. Seventh quarterly technical progress report, July 1, 1994–September 30, 1994, 20:8470 (R;US)
Stakeholder involvement report for the Cryocell® demonstration at Hanford, 20:7864 (R;US)

Sample Preparation
Uranium-contaminated soils: Ultramicrotomy and electron beam analysis, 20:7441 (R;US)

Sampling
Sampling and analysis of soil from the old F-Area effluent ditch and its surrounding wetlands, 20:7435 (R;US)

Surface Contamination
Measuring program of the Federal Republic of Germany. Results of environmental measurement in Russia, Byelorussia and Ukraine in the time from May 17 to September 2, 1993, and from October 8 to November 1, 1993, 20:8496 (R;DE;In German)

SOLANUM TUBEROSUM
Development of technique on the induction and selection of in vitro mutant lines (Potato, Solanum tuberosum L.), 20:8603 (R;KR;In Korean)

SOLAR BATTERIES
See SOLAR CELL ARRAYS

SOLAR CELL ARRAYS
Automated solar cell assembly teamed process research. Semi-annual subcontract report, December 6, 1993–June 30, 1994, 20:7584 (R;US)
Technical evaluation of a dual-junction same-band-gap amorphous silicon photovoltaic system at NREL, 20:7598 (R;US)

SOLAR CELLS
See also GALLIUM ARSENIDE SOLAR CELLS
SILICON SOLAR CELLS
Automated solar cell assembly teamed process research. Semi-annual subcontract report, December 6, 1993–June 30, 1994, 20:7584 (R;US)
Reflectance control for multicrystalline-silicon photovoltaic modules using textured-dielectric coatings, 20:7591 (R;US)

SOLAR COLLECTORS
Improvement of effect of a solar heating system, 20:7603 (R;DK;In Danish)
MF-demonstration project at Wewer's Brickyard in Helsinge, 20:7601 (R;DK)
Renewable Energy Demonstration Project by the National Renewable Energy Laboratory and the General Services Administration, 20:7586 (R;US)

SOLAR ENERGY
Appendix model performance - model documentation renewable fuels module of the National Energy Modeling System, 20:7886 (R;US)

SOLAR ENERGY RESEARCH INSTITUTE
See NATIONAL RENEWABLE ENERGY LABORATORY

SOLAR EQUIPMENT
See also PHOTOVOLTAIC POWER SUPPLIES
SOLAR CELL ARRAYS
SOLAR CELLS
SOLAR COLLECTORS
SOLAR WATER HEATERS
Renewable Energy Demonstration Project by the National Renewable Energy Laboratory and the General Services Administration, 20:7586 (R;US)

SOLAR NEUTRINOS
Landau-Zener treatments of solar neutrino oscillations, 20:8688 (R;US)

SOLAR RADIATION
Microphysical and compositional influences on shortwave radiative forcing of climate by sulfate aerosols, 20:8431 (R;US)
Standardization of direct and global solar radiation in Korea (II), 20:7966 (R;KR;In Korean)

SOLAR WATER HEATERS
Renewable Energy Demonstration Project by the National Renewable Energy Laboratory and the General Services Administration, 20:7586 (R;US)

SOLFRAC PROCESS
See ENHANCED RECOVERY

SOLID CLUSTERS
Nanostructured materials, 20:8972 (R;US)
Small angle X-ray scattering studies of aggregation in supercritical fluid solutions, 20:8191 (R;US)

SOLID ELECTROLYTE FUEL CELLS
Monolithic solid oxide fuel cell technology advancement for coal-based power generation. Quarterly technical progress report, January–March 1994, 20:7917 (R;US)

Anodes
Processing of $LaCrO_3$ for solid oxide fuel cell applications, 20:7929 (RA;US)

Cathodes
Processing of $LaCrO_3$ for solid oxide fuel cell applications, 20:7929 (RA;US)

Design
Tubular Solid Oxide Fuel Cell Development Program, 20:7918 (RA;US)

Material Substitution
Alternative materials for solid oxide fuel cells, 20:7922 (RA;US)

Materials Testing
Thermoelectric power of solid oxide fuel cell materials, 20:7946 (R;DK)

Performance
Tubular Solid Oxide Fuel Cell Development Program, 20:7918 (RA;US)
Tubular solid oxide fuel cell demonstration activities, 20:7919 (RA;US)

Research Programs
Advances in research for solid oxide fuel cells, 20:7915 (R;US)
Advances in research for solid oxide fuel cells, 20:7921 (RA;US)
Alternative materials for solid oxide fuel cells, 20:7922 (RA;US)
Monolithic solid oxide fuel cell technology advancement for coal-based power generation. Final report, September 1989–March 1994, 20:7916 (R;US)
Sealant materials for the solid oxide fuel cell, 20:7930 (RA;US)
Solid oxide fuel cells material research, 20:7920 (RA;US)
Support research for solid oxide fuel cells, 20:7923 (RA;US)

Reviews
Fuel cells - an international perspective, 20:7945 (RA;US)

Solid Electrolytes
Perovskite solid electrolytes for SOFC, 20:7933 (RA;US)

Technology Assessment
Fuel cells - an international perspective, 20:7945 (RA;US)
SOFC development for logistics fuel applications, 20:7937 (RA;US)
Tubular solid oxide fuel cell demonstration activities, 20:7919 (RA;US)

Thermoelectric Properties
Thermoelectric power of solid oxide fuel cell materials, 20:7946 (R;DK)

SOLID ELECTROLYTES
Perovskite solid electrolytes for SOFC, 20:7933 (RA;US)

SOLID SCINTILLATION DETECTORS
See also BGO DETECTORS
NAI DETECTORS
$LuAlO_3$: A high density, high speed scintillator for gamma detection, 20:8392 (R;US)

SOLID WASTES
See also MINERAL WASTES
Hanford Permanent Isolation Barrier Program: Asphalt technology data and status report - FY 1994, 20:7341 (R;US)
Management of dry flue gas desulfurization by-products in underground mines. Annual report, October 1993–September 1994, 20:7153 (R;US)
Pollution prevention opportunity assessment for Building 922 solid office waste, 20:7356 (R;US)

SOLIDS
Fine particle aspects of fluidized bed processes, 20:7184 (RA;FI)

SOLITONS
Vacuum polarization by solitons in (1+1) dimensions, 20:8761 (IA;IR;In English, Persian)
SOLUTION MINING
Changes in the ground water regime in the Straz block due to uranium mining, 20:7450 (IA;CZ;In Czech)
Current effects of environmental provisions during uranium mining in the Ceska Lipa district, 20:7447 (IA;CZ;In Czech)
Methodology of model approaches to ground water reclamation at the Straz deposit, 20:8538 (IA;CZ;In Czech)
SOLVENTS
See also ORGANIC SOLVENTS
Advanced heat pump for recovery of volatile organic compounds, Phase III - demonstration of BCSRHP mobile regenerator. Final report, 20:8024 (R;US)
Fast reactions in the positron spur in polar solvents., 20:8968 (IA;MX)
SOUTH DAKOTA
Improved recovery demonstration for Williston Basin carbonates. Quarterly report, June 1–September 30, 1994, 20:7223 (R;US)
SOUTH KOREA
See REPUBLIC OF KOREA
SOUTHEAST REGION
See USA
SOUTHWEST REGION
See USA
SOVIET UNION
See USSR
SOYBEANS
The application of irradiation techniques for food preservation and process improvement -Studies on application of radiation and radioisotopes-, 20:8605 (R;KR;In Korean)
SPACE HEATING
Heat cost allocation in Finland, 20:7980 (R;FI;In Finnish)
SPACE LATTICES
See CRYSTAL LATTICES
SPACE POWER REACTORS
Electrical insulator assembly with oxygen permeation barrier, 20:7680 (PA;US)
Thermodynamical optimization of the space power plants on the base of criterion of specific mass in generalized design variables, 20:7679 (R;RU;In Russian)
SPACE POWER UNIT REACTOR
See SPACE POWER REACTORS
SPACE VEHICLES
Computer support for cooperative tasks in Mission Operations Centers, 20:9185 (R;US)
Silicon heat pipes for cooling electronics, 20:8257 (R;US)
SPARK IGNITION ENGINES
The development of diagnostic techniques for the spark discharge and the flame characteristics, applied in a lean burn spark ignition engine to examine the relations between the spark discharge, the flame, the heat release and the fluid flow, 20:8059 (R;SE)
SPARTICLES
Search for supersymmetric $\tilde{W}_1$ and $\tilde{Z}_2$ states using the D0 detector, 20:8788 (R;US)
Signatures of virtual LSPs at the TEVATRON, 20:8831 (R;XA)
Squark mass determination at a future linear collider, 20:8838 (R;US)
Structure formation with majoron supermultiplet, 20:8759 (R;XA)
Supersymmetric magnetic moments sum rules and spontaneous supersymmetry breaking, 20:8830 (R;XA)
SPECIAL PRODUCTION REACTORS
100 Areas weekly report, June 9, 1955, 20:7705 (R;US)
300-M Area weekly report, November 4–10, 1955, Savannah River Plant, 20:7767 (R;US)
SPECIAL RELATIVITY THEORY
See RELATIVITY THEORY
SPECTRA (NEUTRON)
See NEUTRON SPECTRA
SPECTRA UNFOLDING
A quick quantitative evaluation of a specific radio nuclide from 'Nucleus Pulse Spectrum Analysis' spectra, 20:8362 (RA;IL)
SPECTROPHOTOMETRY
Spectrophotometric method for the determination of Thorium in urine using anionic resin and arsenazo (III)., 20:8159 (IA;MX)
SPEED INDICATORS
See VELOCIMETERS
SPENT FUEL CASKS
Design review report FFTF interim storage cask, 20:7283 (R;US)
Sealed canister liquid sampling for fuel characterization shipments, 20:8636 (R;US)
Unreviewed safety question evaluation of 100 K West fuel canister gas and liquid sampling, 20:7497 (R;US)
Unreviewed safety question evaluation of 100K East and 100K West in-basin fuel characterization program activities, 20:7496 (R;US)
SPENT FUEL ELEMENTS
Experimental Chemical Milling Process to Decontaminate and Disposition Reactor Fuel at the Savannah River Site, 20:7431 (R;US)
SPENT FUEL STORAGE
CSER 94-014: Storage of metal-fuel loaded EBR-II casks in concrete vault on PFP grounds, 20:8245 (R;US)
Plutonium Finishing Plant safety evaluation report, 20:7469 (R;US)
Savannah River Technology Center monthly report: August 1994, 20:7261 (R;US)
Unreviewed safety question evaluation of 100 K West fuel canister gas and liquid sampling, 20:7497 (R;US)
Unreviewed safety question evaluation of 100K East and 100K West in-basin fuel characterization program activities, 20:7496 (R;US)
SPENT FUELS
Application of active neutronic interrogation method to the line analysis in reprocessing plant, 20:7264 (R;FR;In French)
Long-term safety of radioactive waste disposal: Reaction of high burnup spent fuel and UO_2 in saline brines at room temperature, 20:8126 (R;DE)
Plutonium arisings and utilization in the United Kingdom, 20:7274 (RA;XA)
Problems concerning the accumulation of isolated plutonium - Situation in Germany, 20:7268 (RA;XA)
Russian prospects for plutonium accumulation and utilization, 20:7271 (RA;XA)
The necessity for and significance of nuclear fuel recycling in Japan, 20:7270 (RA;XA)
The role of plutonium in the nuclear power programme of India, 20:7269 (RA;XA)
Utilization in BN-800 fast reactors of isolated plutonium being accumulated in the Russian Federation, 20:7272 (RA;XA)
SPENT LIQUORS
A laminar entrained flow reactor for the study of aerosol formation and deposition during black liquor combustion and pyrolysis, 20:7545 (RA;FI)
Aerosols in black liquor combustion, 20:7559 (RA;FI)
Rejuvenation and recovery of electroplating acids using the WADR technology, 20:8038 (R;US)
SPIN-OFF
See TECHNOLOGY TRANSFER
SPINELS
K-shell ionization under zone axis electron diffraction conditions, 20:9018 (R;AU)
SPONTANEOUS COMBUSTION
Development and testing of new methods for prevention and suppression of spontaneous combustion fires in coal mining. Final report, 20:7164 (R;DE)
SPUR REACTOR
See SPACE POWER REACTORS
SR-0F REACTOR
See ZERO POWER REACTORS
STACK DISPOSAL
Stack gas flow measurement based on fan characteristics, 20:8468 (R;SE;In Swedish)
STACKS
Acceptance test procedure for the 340-NT-EX stack upgrades. Project W-337, 20:7457 (R;US)

STAINLESS STEEL-18-4-1
See STAINLESS STEELS
STAINLESS STEEL-19-9DL
See STAINLESS STEELS
STAINLESS STEEL-304
X-ray photoelectron spectroscopy analysis of cleaning procedures for synchrotron radiation beamline materials at the Advanced Photon Source, 20:8332 (R;US)
STAINLESS STEEL-316
Pitting corrosion of aluminized seals in molten carbonate fuel cells, 20:7928 (RA;US)
STAINLESS STEEL-316L
Robotic weld overlay coatings for erosion control. Quarterly technical progress report, July–September, 1994, 20:8078 (R;US)
STAINLESS STEELS
PEP-II vacuum system - joining SS flanges to copper beam chambers, 20:8327 (R;US)
STANDARD ELECTROWEAK MODEL
See WEINBERG-SALAM GAUGE MODEL
STANDING CROP
See BIOMASS
STARFIRE TOKAMAK
Calculation of transmutation in copper and comparison with measured electrical properties, 20:8105 (R;US)
STARFISH EVENT
See NUCLEAR EXPLOSIONS
STATE BUILDINGS
See PUBLIC BUILDINGS
STATE DIAGRAMS
See PHASE DIAGRAMS
STEADY-STATE FUSION REACTORS
Radioactivity computation of steady-state and pulsed fusion reactors operation, 20:9095 (R;US)
STEAM
Loads affecting the reactor pressure vessel in the event of a steam explosion, 20:7796 (RA;DE;In German)
Steam explosion, premixing experiments with solid spheres, 20:7802 (RA;DE;In German)
Studies into steam explosion scenarios, 20:7795 (RA;DE;In German)
Theoretical analyses of interactions between core melt and coolant, 20:7803 (RA;DE;In German)
STEAM CONDENSERS
Heat-rate improvements obtained by retubing condensers with new, enhanced tube types, 20:7627 (R;US)
STEAM COOLANT
See STEAM
STEAM GENERATORS
A study on the thermal and mechanical properties of inconel for steam generator U-tube, 20:7693 (R;KR;In Korean)
Development of non-destructive testing technology for the crack-like defects of steam generator tubes (II), 20:8262 (R;KR;In Korean)
Inconel alloys development -Development of the advanced nuclear materials-, 20:8101 (R;KR;In Korean)
The development of optimal design technology in robotics -The development of advanced robotics for the nuclear industry-, 20:8234 (R;KR;In Korean)
STEAM LINES
Thermal-Hydraulics of a steam discharge system, 20:7663 (R;KR;In Korean)
STEAM TURBINES
Heat-rate improvements obtained by retubing condensers with new, enhanced tube types, 20:7627 (R;US)
STEEL-000KH25
See STAINLESS STEELS
STEEL-000KH28
See STAINLESS STEELS
STEEL-00KH20N32T
See STAINLESS STEELS
STEEL-03KH13AG13
See STAINLESS STEELS
STEEL-0KH18G8N2T
See STAINLESS STEELS
STEEL-12KH2MV8FB
See STEELS
STEEL-12KH2V5FB
See STEELS
STEEL-18MNV6
See STEELS
STEEL-CR12MOV
Modification of high-chromium die steel by ion alloying, 20:8096 (IA;RU;In Russian)
STEEL-KH12M
See STEEL-CR12MOV
STEELS
See also HIGH ALLOY STEELS
LOW ALLOY STEELS
MARTENSITIC STEELS
Atmospheric corrosion monitoring at the US Department of Energy's Oak Ridge K-25 Site, 20:7296 (R;US)
STES
See SEASONAL THERMAL ENERGY STORAGE
STIRLING CYCLE
Stirling cycle refrigerators and heat pumps, 20:7997 (RA;US)
STOMATA
A model for gas exchange through stomata, 20:8438 (RA;FI)
The photosynthetic acclimation of Lolium perenne growing in a free-air CO_2 enrichment (FACE) system, 20:8585 (R;US)
STONE AND WEBSTER COAL SOLUTION GASIFICATION PROCESS
See COAL GASIFICATION
STONE AND WEBSTER GASIFICATION PROCESS
See COAL GASIFICATION
STORAGE (SPENT FUEL)
See SPENT FUEL STORAGE
STORAGE BATTERIES
See ELECTRIC BATTERIES
STORAGE DEVICES (DATA)
See MEMORY DEVICES
STORAGE FACILITIES
DACS upgrade acceptance test report, 20:7394 (R;US)
Global modeling of Hanford tank waste pretreatment alternatives within a total cleanup system using ASPEN PLUS™, 20:7371 (R;US)
Operability test procedure [Tank] 241-SY-101 equipment removal system, 20:7405 (R;US)
Parametric design using IGRIP, 20:7353 (R;US)
Results of falling barrier analyses, 20:7378 (R;US)
Rocking response of tanks containing two liquids, 20:8223 (R;US)
Sloshing response of nonuniform density liquid in a laterally excited tank, 20:8224 (R;US)
Tank Waste Remediation System tank waste pretreatment and vitrification process development testing requirements assessment, 20:7411 (R;US)
Test report – Prototype core sampler, 20:7421 (R;US)
Work plan for upgrading the 241-A-701 compressed air system and motor control center. Revision 1, 20:7423 (R;US)
STORAGE RINGS
See also BROOKHAVEN RHIC
PEP STORAGE RINGS
SUPERCONDUCTING SUPER COLLIDER
Exotic colliders, 20:8295 (R;US)
STORES
See COMMERCIAL BUILDINGS
STRANGE BARYONS
See HYPERONS
STRAW
Analysis of straw and straw ashes. Compilation of comments received. Part 1-4, 20:7557 (R;DK)
Analysis of straw and straw ashes. Part 1. Recommended methods for basic parameters, 20:7553 (R;DK)
Analysis of straw and straw ashes. Part 2. Basic parameters which demands further investigation of suitable analytical methods, 20:7554 (R;DK)
Analysis of straw and straw ashes. Part 3. Alternative characterization methods, 20:7555 (R;DK)

Interview and literature study of combustion and deposition characteristics of straw, 20:7558 (R;DK;In Danish)
Shaft furnace gasification with a view to to cogeneration of heat and power. Partial report no 4: Straw gasification - tests 6-7: gas washing, 20:7551 (R;DK;In Danish)
Shaft furnace gasification with regard to cogeneration of heat and power. Partial report no. 2: Gasification of straw - test 1-5, 20:7549 (R;DK;In Danish)
Shaft furnace gasification with regard to cogeneration of heat and power. Partial report no 5 - Final report. Gasification of wood chips - test 8-9. Gasification of straw - test 10-14, 20:7550 (R;DK;In Danish)

STREAMER SPARK CHAMBERS
Streamer Chamber Memory Time Measurement with an Auxiliary Spark Chamber, 20:8387 (R;XJ;In Russian)

STREETS
See ROADS

STRING MODELS
A BRST charge for non-critical $W_{2,s}$ strings, 20:8724 (R;XA)
Quantum corrections for a cosmological string solution, 20:8735 (R;US)

STRONG INTERACTIONS
A test of the flavor independence of strong interactions, 20:8817 (R;US)
A test of the flavor independence of strong interactions, 20:8808 (R;US)

STRONTIUM
Organic destruction to enhance the separation of strontium in radioactive wastes, 20:7351 (R;US)

STRONTIUM 90
Bench-scale treatability studies for simulated incinerator scrubber blowdown containing radioactive cesium and strontium, 20:7335 (R;US)
Soil treatment to remove uranium and related mixed radioactive heavy metal contaminants. Seventh quarterly technical progress report, July 1, 1994–September 30, 1994, 20:8470 (R;US)
The cascade of reservoirs of the "Mayak" Plant: Case history and the first version of a computer simulator, 20:7479 (R;US)
Web technology in the separation of strontium and cesium from INEL-ICPP radioactive acid waste (WM-185), 20:7342 (R;US)

STRONTIUM 91
g-Factor of the $3/2^+$ 93.6 keV level of ^{91}Sr, 20:8856 (RA;IL)

STRONTIUM OXIDES
Cooling rate effects on the microstructure, critical current density, and $T_c$transition of one- and two-powder BSCCO-2223 Ag-sheathed tapes, 20:8115 (R;US)
Effects of Bi and Bi_2O_3 additions on the microstructure and superconducting properties of powder-in-tube BSCCO (2212) tapes, 20:8113 (R;US)
Oxygen stoichiometry and its influence on superconductivity in $Bi_2Sr_2CaCu_2O_{8+x}$, 20:8114 (R;US)
Solution based synthesis of perovskite-type oxide films and powders, 20:8127 (R;US)
The real structure of columnar pinning centers in heavy-ion-irradiated cuprate superconductors, 20:8119 (R;US)

STRUCTURE (CRYSTAL)
See CRYSTAL STRUCTURE

STRUCTURE FUNCTIONS
Once more on the radiative corrections to the nucleon structure functions in QCD, 20:8758 (R;XA)

STRUCTURES (BUILDINGS)
See BUILDINGS

STRUCTURES (MECHANICS)
See MECHANICAL STRUCTURES

STUDS
See FASTENERS

STYRENE POLYMERS
See POLYSTYRENE

SUBCONTRACTORS
See CONTRACTORS

SUBCRITICALITY
See CRITICALITY

SUBMARINES
Potential risks of nuclear ships, 20:7784 (R;DK)

SUBSIDENCE (GROUND)
See GROUND SUBSIDENCE

SUBSTRATES
Micro heat spreader enhanced heat transfer in MCMs, 20:8279 (R;US)
Non-destructive characterization of porous silicon using X-ray reflectivity, 20:8145 (R;US)

SUBURBS
See URBAN AREAS

SUCCINIC ACID
Biologically produced succinic acid: A new route to chemical intermediates, 20:7543 (R;US)

SULFATE-REDUCING BACTERIA
Microbial reduction of SO_2 and NO_x as a means of by-product recovery/disposal from regenerable processes for the desulfurization of flue gas. Technical progress report, September 11, 1992–December 11, 1992, 20:7155 (R;US)

SULFITE WASTE LIQUOR
See SPENT LIQUORS

SULFUR
Advanced sulfur control concepts in hot-gas desulfurization technology: Phase 1, Feasibility of the direct production of elemental sulfur during the regeneration of high temperature desulfurization sorbents, 20:7107 (R;US)

SULFUR DIOXIDE
Advanced separation technology for flue gas cleanup. Quarterly technical report No. 10, 20:7635 (R;US)
Correlations between CN and SO_2 concentrations at Vaerrioe research station, 20:8444 (RA;FI)
Cross-flow, filter-sorbent-catalyst for particulate, SO_2 and NO_x control. Final report, 20:7171 (R;US)
Electric Power Research Institute: Environmental Control Technology Center report to the Steering Committee, August 1994. [Monthly report], 20:7160 (R;US)
Electric Power Research Institute: Environmental Control Technology report to the Steering Committee, July 1994. [Monthly report], 20:7159 (R;US)
Investigation of combined SO_2/NO_x removal by Ceria sorbents. Quarterly technical progress report, July 1994–September 1994, 20:7154 (R;US)

SULFUR HYDRIDES
See HYDROGEN SULFIDES

SULFUR OXIDES
See also SULFUR DIOXIDE
Development of high efficient process for simultaneous removal of SOx and NOx from flue gas (III), 20:7970 (R;KR;In Korean)

SULFUR SULFIDES
See SULFUR

SULFURIC ACID
Rejuvenation and recovery of electroplating acids using the WADR technology, 20:8038 (R;US)
Thermodynamic modeling of hydrogen fluoride production relevant to actinide residue treatment, 20:7263 (R;US)

SUM RULES
Form Factor of the Process $\gamma^*\gamma^* \rightarrow \pi^0$ for Small Virtuality of One of the Photons and QCD Sum Rules (2): Sum Rule, 20:8764 (R;XJ)

SUPERCOMPUTERS
NYU Ultracomputer project. Final project summary, 1979-1993, 20:9161 (R;US)

SUPERCONDUCTING JUNCTIONS
See also JOSEPHSON JUNCTIONS
Device-quality tunnel junctions on the high $T_c$superconductor $HgBa_2CuO_{4+\delta}$, 20:8117 (R;US)
Radiation and high-field-induced interface state generation in MOS structures with modified nitrided oxide, 20:8403 (RA;IL)

SUPERCONDUCTING MAGNETIC ENERGY STORAGE
Availability analysis of a 100 kWh superconducting magnetic energy storage, 20:7827 (R;FI)

SUPERCONDUCTING MAGNETS
Development of superconductor application technology - Advanced nuclear materials development-, 20:9038 (R;KR;In Korean)
SUPERCONDUCTING SUPER COLLIDER
A feasibility study for a manufacturing technology deployment center, 20:8021 (R;US)
A report: A plan to establish Internet access points at Minority Campus sites for connection to a central computing facility, 20:9163 (R;US)
The development of a positron ionization gauge, 20:8415 (R;US)
SUPERCONDUCTING WIRES
Development of superconductor application technology - Advanced nuclear materials development-, 20:9038 (R;KR;In Korean)
SUPERCONDUCTIVITY
Superconductivity Program for electric power systems: 1994 annual PEER review. Volume 1, Meeting proceedings, 20:9030 (R;US)
Superconductivity Program for electric power systems: 1994 annual PEER review. Volume 2, Meeting proceedings, 20:9031 (R;US)
SUPERCONDUCTORS
See also HIGH-TC SUPERCONDUCTORS
Current distributions in superconducting wires subject to a random orientation magnetic field, and corresponding to the Tokamak usual conditions, 20:9033 (R;FR;In French)
Practical superconductor development for electrical power applications, annual report for FY 1994, 20:8268 (R;US)
The effects of H^+ implants on $YBa_2Cu_3O_7$ superconducting materials, 20:9028 (R;CN;In Chinese)
SUPERCRITICAL FLOW
See TURBULENT FLOW
SUPERFLUIDITY
Hamiltonian dynamics of the condensed media with spontaneously broken symmetry, 20:9023 (R;XA)
SUPERFUND
See US SUPERFUND
SUPERHEAVY ELEMENTS
See TRANS 104 ELEMENTS
SUPERLATTICES
A simple, closed-form expression for the x-ray reflectivity from superlattices with cumulative roughness, 20:8991 (R;US)
Acoustomagnetoelectric effect in a superlattice, 20:8696 (R;XA)
SUPERSYMMETRIC PARTICLES
See SPARTICLES
SUPPORTS
Wind and seismic analysis for liquid-level gauge support, 20:7395 (R;US)
SURFACE BARRIER DETECTORS
Nuclear reaction analysis - Development and application, 20:8394 (R;SE)
SURFACE CONTAMINATION MONITORS
Alpha and beta radioactivity contamination counting system, 20:8359 (RA;IL)
SURFACE TREATMENTS
A statistical analysis of the effect of PECVD deposition parameters on surface and bulk recombination in silicon solar cells, 20:7588 (R;US)
Development of industrial ion implantation technology, 20:9011 (R;KR;In Korean)
The effect of encapsulation on the reflectance of photovoltaic modules using textured multicrystalline-silicon solar cells, 20:7592 (R;US)
SURFACE WATERS
See also LAKES
SEAS
Environmental monitoring plan, July 1–December 31, 1994, 20:7855 (R;US)
Environmental monitoring report, May 10, 1993–June 1, 1994, 20:7854 (R;US)
FY 1995 Remedial Investigation Work Plan for Waste Area Grouping 2 at Oak Ridge National Laboratory, Oak Ridge, Tennessee, 20:7298 (R;US)
Third annual environmental restoration monitoring and assessment report for FY 1994 of the Oak Ridge National Laboratory, Oak Ridge, Tennessee, 20:7471 (R;US)
SURFACE-ACTIVE AGENTS
See SURFACTANTS
SURFACES
Generalized Kummer surfaces and differentiable invariants of Noether-Horikawa surfaces 1, 20:8677 (R;XA)
SURFACTANTS
Quantitation of microbial products and their effectiveness in enhanced oil recovery. Final report, 20:7199 (R;US)
Surfactant loss control in chemical flooding: Spectroscopic and calorimetric study of adsorption and precipitation on reservoir minerals. Quarterly technical progress report, April 1, 1994–June 30, 1994, 20:7210 (R;US)
Surfactant loss control in chemical flooding: Spectroscopic and calorimetric study of adsorption and precipitation on reservoir minerals. Quarterly technical progress report, July 1, 1994–October 31, 1994, 20:7211 (R;US)
SURRY POWER STATION UNIT-1
See SURRY-1 REACTOR
SURRY POWER STATION UNIT-2
See SURRY-2 REACTOR
SURRY-1 REACTOR
Risk contribution from low power, shutdown, and other operational modes beyond full power, 20:7650 (R;US)
SURRY-2 REACTOR
Risk contribution from low power, shutdown, and other operational modes beyond full power, 20:7650 (R;US)
SURRY-3 REACTOR
Risk contribution from low power, shutdown, and other operational modes beyond full power, 20:7650 (R;US)
SURRY-4 REACTOR
Risk contribution from low power, shutdown, and other operational modes beyond full power, 20:7650 (R;US)
SURVEILLANCE
Report on the inspection of the status of the disposal of technical Surveillance Equipment at the Central Training Academy, Albuquerque, New Mexico, 20:9131 (R;US)
SURVEILLANCE (RADIOACTIVITY)
See RADIATION MONITORING
SURVEY (RADIOACTIVITY)
See RADIATION MONITORING
SUSPENSIONS (FUEL)
See FUEL SLURRIES
SWEDEN
Activity report. July 1993 - June 1994, 20:9148 (R;SE)
Aespoe Hard Rock Laboratory. Annual Report 1993, 20:7360 (R;SE)
Decommissioning of Swedish nuclear power reactors. Technology and costs, 20:7647 (R;SE;In Swedish)
Radioactive waste processing and disposal. A complement to the program 1992, 20:7332 (R;SE;In Swedish)
Tectonic framework of the Hanoe Bay area, southern Baltic Sea, 20:8514 (R;SE)
SWITCHES
BCP selector valves and limit switches, 20:7381 (R;US)
SWITZERLAND
Colloid properties in groundwaters from crystalline formations, 20:8513 (R;CH)
Energy conversion research at the PSI: combustion, fuels from biomass, solar energy, 20:7914 (IA;CH)
Internalisation of external costs in Switzerland and Europe, 20:7843 (IA;CH)
Nuclear power plant safety in the framework of future energy systems, 20:7782 (IA;CH)
Problems concerning the accumulation of isolated plutonium - The Swiss situation, 20:7273 (RA;XA)
Programme and book of abstracts, 20:7834 (I;CH;In English, German, French)
Sustainability: ecology comes of age, 20:7838 (IA;CH)
The energy storage program of PSI, 20:7825 (IA;CH)
Trends in safety assessment of radioactive waste repositories, 20:7295 (IA;CH)

SWORDFISH EVENT
See NUCLEAR EXPLOSIONS
SYMBOLIC LOGIC
See MATHEMATICAL LOGIC
SYMMETRY GROUPS
On the inhomogeneous quantum groups, 20:8726 (IA;IR;In English, Persian)
Quantum chains with G L q(2) symmetry, 20:8727 (IA;IR;In English, Persian)
SYNCHROTRON RADIATION SOURCES
See also ADVANCED LIGHT SOURCE
ADVANCED PHOTON SOURCE
NSLS
Some thoughts of future experiments with the new generation of storage rings, 20:8965 (R;US)
SYNOVIA
See BONE JOINTS
SYNTHESIS GAS
Shaft furnace gasification with regard to cogeneration. Partial report no. 1: Catalytic cracking of tar in synthesis gas. Bench-scale tests with hydro cracking catalysts, 20:7548 (R;DK;In Danish)
SYNTHETIC FUELS
Bioprocessing in nonaqueous media - critical needs and opportunities, 20:7570 (R;US)
SYNTHINE PROCESS
See FISCHER-TROPSCH SYNTHESIS

T

TANK FARMS
See STORAGE FACILITIES
TANKS
Backfilling
Soil weight (lbf/ft^3) at Hanford waste storage locations (2 volumes), 20:7409 (R;US)
Cleaning
Technology study of Gunite tank sludge mobilization at Oak Ridge National Laboratory, Oak Ridge, Tennessee, 20:7484 (R;US)
Decontamination
Tank waste processing analysis: Database development, tank-by-tank processing requirements, and examples of pretreatment sequences and schedules as applied to Hanford Double-Shell Tank Supernatant Waste - FY 1993, 20:7338 (R;US)
Design
Design demonstrations for category B tank systems at Oak Ridge National Laboratory, Oak Ridge, Tennessee, 20:7300 (R;US)
Design/installation and structural integrity assessment under the Federal Facility Agreement for Bethel Valley low-level waste collection and transfer system upgrade for Building 2026 (High Radiation Level Analytical Laboratory) and Building 2099 (Monitoring and Control Station) at Oak Ridge National Laboratory, 20:7299 (R;US)
Fastening
242-A Evaporator Condensate Tank (TK-C-100) tie down evaluation, 20:7499 (R;US)
Fluid Mechanics
Rocking response of tanks containing two liquids, 20:8223 (R;US)
Sloshing response of nonuniform density liquid in a laterally excited tank, 20:8224 (R;US)
In-Service Inspection
Inspection system performance test procedure, 20:7393 (R;US)
Inspection
Design criteria for the light duty utility arm system end effectors, 20:7379 (R;US)
Single Shell Tank Waste Characterization Project for Tank B-110, Core 9 - data package and PNL validation summary report, 20:7398 (R;US)
Leak Testing
Acceptance test procedure, 241-SY-101 Flexible Receiver System, Phase III testing, 20:7392 (R;US)
Selection of liquid-level monitoring method for the Oak Ridge National Laboratory inactive liquid low-level waste tanks, remedial investigation/feasibility study, 20:7333 (R;US)
Levels
Wind and seismic analysis for liquid-level gauge support, 20:7395 (R;US)
Load Analysis
Accelerated safety analyses - structural analyses Phase I - structural sensitivity evaluation of single- and double-shell waste storage tanks, 20:7407 (R;US)
Monitoring
Engineering test plan for Tank 241-SY-101 in situ viscometer. Revision 1, 20:7418 (R;US)
Evaluation of AY/AZ tank farm ventilation system during aging waste retrieval operations, 20:7412 (R;US)
Historical Tank Content Estimate for the Northwest Quandrant of the Hanford 200 East Area, 20:7400 (R;US)
Historical Tank Content Estimate for the Southwest Quandrant of the Hanford 200 West Area, 20:7401 (R;US)
Operability test procedure for the TK-900 effluent monitoring station, 20:7406 (R;US)
Project W-340 long reach arm retrieval system balance of plant instrumentation workshop engineering study, 20:7389 (R;US)
Tank 241-C-102 tank characterization plan, 20:7417 (R;US)
Tank 241-TX-105 tank characterization plan, 20:7419 (R;US)
Pipe Fittings
Leachate storage transport tanker loadout piping, 20:7382 (R;US)
Pumping
Operability test procedure for the TK-900 effluent monitoring station, 20:7406 (R;US)
Radioactive Waste Storage
Distributions of 12 elements on 64 absorbers from simulated Hanford Neutralized Current Acid Waste (NCAW), 20:7323 (R;US)
Single Shell Tank Waste Characterization Project for Tank B-110, Core 9 - data package and PNL validation summary report, 20:7398 (R;US)
Remedial Action
A chemical model for the major electrolyte components of the Hanford waste tanks. The binary electrolytes in the system: $Na\text{-}NO_3\text{-}NO_2\text{-}SO_4\text{-}CO_3\text{-}F\text{-}PO_4\text{-}OH\text{-}Al(OH)_4\text{-}H_2O$, 20:7348 (R;US)
Evaluation of AY/AZ tank farm ventilation system during aging waste retrieval operations, 20:7412 (R;US)
High-level waste management technology program plan, 20:7315 (R;US)
Tank 241-C-102 tank characterization plan, 20:7417 (R;US)
Tank 241-TX-105 tank characterization plan, 20:7419 (R;US)
Remote Handling Equipment
Design criteria for the light duty utility arm system end effectors, 20:7379 (R;US)
Safety Analysis
Accelerated safety analyses - structural analyses Phase I - structural sensitivity evaluation of single- and double-shell waste storage tanks, 20:7407 (R;US)
Scaling
Engineering scale mixing system tests for MWTF title II design, 20:7386 (R;US)
Seismic Effects
242-A Evaporator Condensate Tank (TK-C-100) tie down evaluation, 20:7499 (R;US)
Dynamic modeling and response of rigid embedded cylinders, 20:8225 (R;US)
Rocking response of tanks containing two liquids, 20:8223 (R;US)
Sloshing response of nonuniform density liquid in a laterally excited tank, 20:8224 (R;US)
Soil-Structure Interactions
Soil weight (lbf/ft^3) at Hanford waste storage locations (2 volumes), 20:7409 (R;US)
Structural Models
Accelerated safety analyses - structural analyses Phase I - structural sensitivity evaluation of single- and double-shell waste storage tanks, 20:7407 (R;US)

Temperature Control
High-heat tank safety issue resolution program plan. Revision 2, 20:7489 (R;US)
Thermal Insulation
The MBB-Vacuum Super Insulation (VSI), 20:7989 (RA;US)
Thermocouples
Structural evaluation of thermocouple probes for 241-AZ-101 waste tank, 20:7385 (R;US)
Ultrasonic Testing
Inspection system performance test procedure, 20:7393 (R;US)
Ventilation Systems
Evaluation of AY/AZ tank farm ventilation system during aging waste retrieval operations, 20:7412 (R;US)
Waste Retrieval
Parametric design using IGRIP, 20:7353 (R;US)
TAPEWORMS
See CESTODES
TAR
Shaft furnace gasification with regard to cogeneration. Partial report no. 1: Catalytic cracking of tar in synthesis gas. Bench-scale tests with hydro cracking catalysts, 20:7548 (R;DK;In Danish)
TAU LEPTONS
See TAU PARTICLES
TAU NEUTRINOS
Status of the project on ν-detection, 20:8318 (RA;RU)
TAU PARTICLES
CP violation tests for tau/top processes, 20:8714 (R;US)
CP violation tests for top/tau processes, 20:8716 (R;US)
Elementary particle physics. Progress report, July 1992–October 1994, 20:8784 (R;US)
Production of polarized τ pairs and tests of CP violation using polarized $e^{\pm}$ colliders near threshold, 20:8738 (R;US)
Tau as a probe for new physics, 20:8783 (R;US)
Tau physics 1994: A theoretical perspective, 20:8825 (R;US)
Tau physics at future facilities, 20:8840 (R;US)
Tests for leptonic CP violation in tau decays, 20:8717 (R;US)
The discovery of the tau lepton: Part 1, The early history through 1975; Part 2, Confirmation of the discovery and measurement of major properties, 1976–1982, 20:8839 (R;US)
TAUONS
See TAU PARTICLES
TBP
Mass transfer model for two-layer TBP oxidation reactions, 20:7437 (R;US)
TCV TOKAMAK
Papers presented at the 15. international conference on plasma physics and controlled nuclear fusion research, 20:9071 (R;CH)
Variable configuration plasmas in TCV, 20:9072 (RA;CH)
TEAK EVENT
See NUCLEAR EXPLOSIONS
TECHNETIUM 99
ICP-MS as advantageous analytical technique for the determination of long-lived ^{99}Tc in the environment, 20:8173 (R;PK)
TECHNICAL INFORMATION CENTER
See US DOE
TECHNOLOGY TRANSFER
A model technology transfer program for independent operators: Kansas Technology Transfer Model (KTTM), 20:7202 (R;US)
Technology transfer 1995, 20:7874 (R;US)
TEFLON
Radiation-induced synthesis and properties of fluorine-containing cation-exchange membranes, 20:8210 (IA;RU;In Russian)
TELOMERES
Molecular architecture of classical cytological landmarks: Centromeres and telomeres, 20:8584 (R;US)
TEMPERATURE MEASUREMENT
High temperature probe, 20:8411 (PA;US)
Method and apparatus for optical temperature measurement, 20:8412 (PA;US)
TENNESSEE
Environmental monitoring plan, July 1–December 31, 1994, 20:7855 (R;US)
Environmental monitoring report, May 10, 1993–June 1, 1994, 20:7854 (R;US)
TERBIUM 147
Particle-phonon excitations in valence-neutron and valence-proton nuclei around ^{146}Gd, 20:8866 (R;DE;In German)
TERRESTRIAL ECOSYSTEMS
Environmental radiation monitoring and terrestrial radioecology - A study on the radiation and environmental safety-, 20:8622 (R;KR;In Korean)
TERTIARY RECOVERY
See ENHANCED RECOVERY
TEST FACILITIES
A study of small explosions and earthquakes during 1961–1989 near the Semipalatinsk Test Site, Kazakhstan, 20:8429 (R;US)
TESTES
Pathology study of radiation injury in the rat testes, 20:8610 (R;CN;In Chinese)
TETRACHLOROMETHANE
See CARBON TETRACHLORIDE
TEWA EVENT
See NUCLEAR EXPLOSIONS
TEXTILE INDUSTRY
The AMTEX Partnership™. Fourth quarter report, September 1994, 20:7877 (R;US)
TFTR DEVICE
See TFTR TOKAMAK
TFTR REACTORS
See TFTR TOKAMAK
TFTR TOKAMAK
Collaborations in fusion research, 20:9125 (R;US)
Initial H-mode experiments in DT plasmas on TFTR, 20:9079 (R;US)
THALLIUM
Nuclear-spin-dependent parity-nonconserving effects in thallium, lead and bismuth atoms, 20:8953 (R;RU)
THALLIUM 203
Nuclear anapole moments in single-particle approximation, 20:8848 (R;RU)
THALLIUM 205
Nuclear anapole moments in single-particle approximation, 20:8848 (R;RU)
THE GEYSERS
See GEYSERS GEOTHERMAL FIELD
THERMAL ENERGY STORAGE EQUIPMENT
Theoretical and experimental investigation of a high-temperature latent heat storage system with a salt ceramic composite as storage medium, 20:7604 (R;DE;In German)
THERMAL INSULATION
1,1,1,4,4,4 Hexafluorobutane, a new non-ozone-depleting blowing agent for rigid PUR foams, 20:8032 (RA;US)
AURA™: A fiberglass based vacuum insulation panel technology, 20:7993 (RA;US)
Aerogels - a foam alternative, 20:7991 (RA;US)
Blowing agents: The next generation, 20:8034 (RA;US)
Cyclopentane as blowing agent for rigid polyurethane foam in refrigerator insulation, 20:8035 (RA;US)
Development of evacuated panel thermal insulations, 20:7990 (RA;US)
HFC 356, a zero ODP blowing agent candidate for North American appliance foam formulations, 20:8033 (RA;US)
Possible future directions for extruded polystyrene foam insulation, 20:7987 (RA;US)
The MBB-Vacuum Super Insulation (VSI), 20:7989 (RA;US)
Vacuum Insulation Panels (VIPs), 20:7992 (RA;US)
THERMAL NEUTRONS
Calculation of thermal neutron scattering law for anisotropic microcrystals, 20:8944 (RA;CN)
THERMAL POLLUTION (AIR)
See AIR POLLUTION
THERMAL POLLUTION (WATER)
See WATER POLLUTION
THERMIONIC REACTOR CRITICAL EXPERIMENTS
See ZERO POWER REACTORS

THERMOCOUPLES
Structural evaluation of thermocouple probes for 241-AZ-101 waste tank, 20:7385 (R;US)

THERMODYNAMIC CYCLES
See also STIRLING CYCLE
Cooling and air conditioning with water/zeolite, 20:7996 (RA;US)
High density energy storage for desiccant cooling systems, 20:8001 (RA;US)
Thermoacoustic refrigeration and acoustic compression, 20:7998 (RA;US)

THERMOELECTRIC CELLS
See THERMOELECTRIC GENERATORS

THERMOELECTRIC CONVERTERS
See THERMOELECTRIC GENERATORS

THERMOELECTRIC GENERATORS
Electrical insulator assembly with oxygen permeation barrier, 20:7680 (PA;US)
Process monitoring using a Quality and Technical Surveillance Program, 20:8077 (R;US)

THERMOLUMINESCENT DOSEMETERS
Computer simulation and characterization of glow curve in contact heating of thermoluminescent detectors, 20:8374 (IA;IR;In English, Persian)
Evaluation of new and conventional thermoluminescent phosphors for environmental monitoring using automated thermoluminescent dosimeter readers, 20:8396 (R;US)
Site-specific calibration of the Hanford personnel neutron dosimeter, 20:8397 (R;US)
Study of the long term stability of peak 4 and 5 in the TLD-100 using computerized glow curve deconvolution and thermal peak isolation techniques. Correlation with isothermal decay measurements at elevated temperatures, 20:8350 (RA;IL)

THERMONUCLEAR FUELS
Magnetized target fusion: An ultra high energy approach in an unexplored parameter space, 20:9070 (R;US)

THERMONUCLEAR IGNITION
Increase gain of volume ignition, 20:9102 (IA;IR;In English, Persian)

THERMONUCLEAR REACTOR MATERIALS
Effect of dynamically charged helium on mechanical properties of vanadium-base alloys, 20:9093 (R;US)
Material development for fusion reactors, 20:9114 (IA;DE)
Materials development for DEMO and commercial fusion reactors, 20:9112 (IA;DE)
Status of the solid breeder materials database, 20:7674 (R;US)
The role of intense neutron sources and other irradiation facilities in materials development, 20:9115 (IA;DE)

THERMONUCLEAR REACTORS
See also PULSED FUSION REACTORS
STEADY-STATE FUSION REACTORS
TOKAMAK TYPE REACTORS
A three-bar model for ratcheting of fusion reactor first wall, 20:9094 (R;US)
Completing a plant to simulate the plasma/wall interaction in a fusion reactor. Final report, 20:9103 (R;DE;In German)
Fusion Programme Evaluation Board, 20:9111 (IA;DE)
Fusion energy and intense neutron sources in China, 20:9118 (IA;DE)
In situ tritium from Li_2O and Li_2ZrO_3 irradiated in a fast neutron flux: BEATRIX-II, Phase 1 and 2, 20:9124 (R;US)
Optimization of beryllium for fusion blanket applications, 20:9091 (R;US)
Plan of new stage fusion R and D in Japan, 20:9109 (IA;DE)
Proceedings of the IEA-workshop on intense neutron sources. IEA-implementing agreement for a programme of research and development on fusion materials. Working group task - annex II, 20:7524 (I;DE)
The possibilities for a staged approach in the development of intense neutron sources, 20:7532 (IA;DE)
U.S. strategy for the development of fusion reactors, 20:9110 (IA;DE)

THERMONUCLEAR WEAPONS
See NUCLEAR WEAPONS

THERMOPILES
See THERMOCOUPLES

THIN FILMS
Polarized Raman spectroscopy of chemically vapour deposited diamond films, 20:9014 (R;AU)

THIO COMPOUNDS
See ORGANIC SULFUR COMPOUNDS

THIOPHOSGENE
See ORGANIC SULFUR COMPOUNDS

THIRD-HARMONIC GENERATION
See HARMONIC GENERATION

THORIUM
Core scanning for Th, U and K. Problems and solutions, 20:8469 (R;DK)

THORIUM 232
The summary for recommended data of natural Zn, ^{232}Th and ^{235}U for CENDL-2, 20:8896 (RA;CN)

THORIUM D
See LEAD 208

THREE MILE ISLAND-1 REACTOR
Status of safety issues at licensed power plants: TMI Action Plan requirements, unresolved safety issues, generic safety issues, other multiplant action issues. Supplement 4, 20:7819 (R;US)

THREE MILE ISLAND-2 REACTOR
Drill core investigations from the TMI-2 pressure vessel. Final report, 20:7787 (R;DE;In German, English)
Status of safety issues at licensed power plants: TMI Action Plan requirements, unresolved safety issues, generic safety issues, other multiplant action issues. Supplement 4, 20:7819 (R;US)

THREE-DIMENSIONAL CALCULATIONS
Elliptic Deformed Classical Mechanics in Three-Dimensional Phase Space, 20:8679 (R;XJ)

THROMBOSIS
Monoclonal antibody (SZ-51) specific for activated platelets is useful in the diagnosis of thrombosis. Final report for the period December 1990 - April 1994, 20:8589 (R;XA)

TIGHT SANDS
See SANDSTONES

TIME-OF-FLIGHT MASS SPECTROMETERS
Recipes for high resolution time-of-flight detectors, 20:8176 (R;US)

TIME-OF-FLIGHT SPECTROMETERS
See also TIME-OF-FLIGHT MASS SPECTROMETERS
Background Event Discrimination in Neutron Time-of-Fight Measurements at Beams of Relativistic Nuclei of the JINR synchrotron, 20:8381 (R;XJ;In Russian)
Development of ultrasensitive spectroscopic analysis technology -Development of atomic spectroscopy technology-, 20:8988 (R;KR;In Korean)
JINR rapid communications. Collection 5, 20:7685 (R;XJ;In English, Russian)

TIN 100
JINR rapid communications. Collection 6, 20:8860 (R;XJ;In English, Russian)

TIN OXIDES
Structural transformations in SnO_2 films bombarded by Kr^+ ions, 20:9008 (IA;RU;In Russian)

TIOGA NITROGEN REMOVAL PROCESS
See NITROGEN

TITANATES
See also PZT
Solution based synthesis of perovskite-type oxide films and powders, 20:8127 (R;US)

TITANIUM
Characterization of { 11-bar 01 } twin dislocation structures in evaporated titanium thin films by HREM, 20:8151 (R;AU)
Generation, detection and characterization of gas-phase transition metal aggregates and compounds. Final technical report, September 15, 1991–July 14, 1994, 20:8181 (R;US)

TITANIUM ALLOYS
See also TITANIUM BASE ALLOYS
Swelling and structure of vanadium-base alloys irradiated in the dynamic helium charging experiment, 20:8070 (R;US)

TITANIUM BASE ALLOYS
Local quantitative phase analysis of two-phase TiAl(Cr)-alloys by analytical transmission electron microscopy, 20:8080 (R;DE;In German)
Study of nitrided titanium, 20:8091 (IA;RU;In Russian)
TITANIUM NITRIDES
Measurement of TiN_x stoichiometry by the method of nuclear proton backscattering, 20:8986 (IA;RU;In Russian)
TITANIUM OXIDES
Development of processing technique for the electrochromic window, 20:7973 (R;KR;In Korean)
Microstructure and composition of a SNS Josephson junction using $CaRuO_3$ as the metallic barrier, 20:9026 (R;US)
TLD (DOSEMETERS)
See THERMOLUMINESCENT DOSEMETERS
TLD SYSTEMS
See THERMOLUMINESCENT DOSEMETERS
TOBACCO SMOKES
Toxic volatile organic compounds in environmental tobacco smoke: Emission factors for modeling exposures of California populations, 20:8461 (R;US)
TOKAMAK DEVICES
See also DOUBLET-3 DEVICE
HL-1 TOKAMAK
ITER TOKAMAK
JET TOKAMAK
PBX DEVICES
STARFIRE TOKAMAK
TCV TOKAMAK
TFTR TOKAMAK
Development of plasma diagnostics technologies -A study on nuclear fusion reactor-, 20:9068 (R;KR;In Korean)
Development of tokamak experiment technology -A study on the nuclear fusion reactor-, 20:9106 (R;KR;In Korean)
Energetic/alpha particle effects on MHD modes and transport, 20:9081 (R;US)
Exploration of low-aspect-ratio tokamak regimes in the CDX-U and TS-3 devices, 20:9089 (R;US)
Field-aligned coordinates for nonlinear simulations of tokamak turbulence, 20:9085 (R;US)
Flow shear induced fluctuation suppression in finite aspect ratio shaped tokamak plasma, 20:9087 (R;US)
MHD simulations of DC helicity injection for current drive in tokamaks, 20:9046 (R;US)
Power oscillator in the Tokamaks training., 20:9053 (I;MX;In Spanish)
Radial electric field measurement in a tokamak by the injection of a pulsed neutral beam, 20:9042 (R;RU)
Study of the dynamics of the lower hybrid wave during current drive in tokamaks and of the Weyl-Wigner in quantum mechanics, 20:9047 (R;FR;In French)
The development of the tokamak system technology -A study on the fusion reactor-, 20:9107 (R;KR;In Korean)
Transport in gyrokinetic tokamaks, 20:9077 (R;US)
Vertical displacement and position control in tokamaks, 20:9069 (R;SE)
Wall stabilization of ideal modes in tokamaks, 20:9074 (RA;CH)
TOKAMAK FUSION TEST REACTOR
See TFTR TOKAMAK
TOKAMAK TYPE REACTORS
See also ITER TOKAMAK
Shakedown analysis of fusion reactor first wall, 20:9096 (R;US)
TOLUENE
Diffusion of volatile organic components through concrete floors, 20:8504 (RA;DK;In Danish)
TOP PARTICLES
Top quark kinematics and mass determination, 20:8828 (R;US)
TOPOLOGICAL MAPPING
Associators in generalized octonionic maps, 20:8683 (R;AU)
TOPONIUM
Toponium energy levels, 20:8834 (IA;IR;In English, Persian)
TOROIDAL PINCH DEVICES
See also REVERSED-FIELD PINCH DEVICES
A linear systems description of the CO_2 laser based tangential imaging system, 20:9078 (R;US)
TOROIDAL PINCH TYPE REACTORS
See TOROIDAL PINCH DEVICES
TOTAL-ABSORPTION SPECTROMETERS
See SHOWER COUNTERS
TOWER FOCUS COLLECTORS
Comparison of three methods for optical characterization of point-focus concentrators, 20:7599 (R;US)
TOWERS (EXTRACTION)
See EXTRACTION COLUMNS
TOXIC MATERIALS
Toxicity values from the U.S. Environmental Protection Agency Integrated Risk Information System and Health Effects Assessment Summary Table, 20:8639 (R;US)
TOXIC SUBSTANCES CONTROL ACT
See TOXIC SUBSTANCES CONTROL ACTS
TOXIC SUBSTANCES CONTROL ACTS
Operating cost guidelines for benchmarking DOE thermal treatment systems for low-level mixed waste, 20:7336 (R;US)
TOXICITY
Toxicity values from the U.S. Environmental Protection Agency Integrated Risk Information System and Health Effects Assessment Summary Table, 20:8639 (R;US)
Toxicological benchmarks for screening potential contaminants of concern for effects on terrestrial plants: 1994 revision, 20:8640 (R;US)
TRACK DETECTORS (GAS)
See GAS TRACK DETECTORS
TRAINING
Alternative systematic approaches to training, 20:7470 (R;US)
Development of training courses in the field of nuclear energy, 20:9199 (R;KR;In Korean)
TRANS 104 ELEMENTS
Synthesis and Properties of Superheavy Nuclei, 20:8930 (R;XJ)
TRANSDUCERS
Innovative directional and position specific sampling technique. Phase 3: Final report, July 1992–September 1994, 20:8416 (R;US)
TRANSFER (HEAT)
See HEAT TRANSFER
TRANSFER (IN ENVIRONMENT)
See RADIONUCLIDE MIGRATION
TRANSFORMATIONS (PHASE)
See PHASE TRANSFORMATIONS
TRANSIENTS
Deflagration-induced pressure and temperature transients in a waste storage facility, 20:7427 (R;US)
TRANSITION ELEMENTS
See also CHROMIUM
COBALT
COPPER
HAFNIUM
IRON
MANGANESE
MOLYBDENUM
NICKEL
NIOBIUM
TITANIUM
TUNGSTEN
VANADIUM
Application of microtron braking gamma radiation to study heavy metal distribution in the process of coal burning, 20:8167 (IA;RU;In Russian)
TRANSITION METALS
See TRANSITION ELEMENTS
TRANSITIONS (ENERGY LEVEL)
See ENERGY-LEVEL TRANSITIONS
TRANSITIONS (PHASE)
See PHASE TRANSFORMATIONS
TRANSMISSION (HEAT)
See HEAT TRANSFER
TRANSMISSION LINES
See POWER TRANSMISSION LINES

TRANSMUTATION
PROSDOR: An IBM-3090 based semi-automated procedure linking HERMES MCNP and KORIGEN for the burnup analysis of accelerator driven cores, 20:7322 (R;DE)
Technical policy with radioactive wastes management, 20:7354 (IA;CH)
TRANSPORT
Emission and energy evaluation principles for transport systems, 20:8014 (R;SE;In Swedish)
Joint-project transport control system. Sub-project: Set-up of a material flow control with integration into the district control center's infrastructure. Final report, 20:7162 (R;DE)
TRANSPORT (GAMMA)
See PHOTON TRANSPORT
TRANSPORT (NEUTRON)
See NEUTRON TRANSPORT
TRANSPORT (PHOTON)
See PHOTON TRANSPORT
TRANSPORTATION SECTOR
Transportation Energy Efficiency Trends, 1972–1992, 20:8017 (R;US)
TRANSURANIUM WASTES
See ALPHA-BEARING WASTES
TRCE(THERMIONIC REACTOR CRITICAL EXPERIMENTS)
See ZERO POWER REACTORS
TREE RINGS
Oxygen-18 content of modern vegetal organic matter in Senegal; relation with climatic parameters, 20:8451 (RA;XA;In French)
TRI-GAS PROCESS
See COAL GASIFICATION
TRIBUTYL PHOSPHATE
See TBP
TRIGA TYPE REACTORS
See also TRIGA-3-SEOUL REACTOR
A study on the decommissioning of research reactor, 20:7771 (R;KR;In Korean)
Results of the MCNP analysis of 20/20 LEU fuel for the Oregon State University TRIGA Reactor, 20:7765 (R;US)
TRIGA-3-SEOUL REACTOR
Environmental radiation monitoring around the research reactors, 20:8618 (R;KR;In Korean)
Environmental radiation monitoring around the research reactors, 20:8619 (R;KR;In Korean)
TRIPLET PARTICLES
See QUARKS
TRITIUM
Development on the technology for tritium removal processes (II), 20:8171 (R;KR;In Korean)
Savannah River Technology Center monthly report: August 1994, 20:7261 (R;US)
Savannah River Technology Center monthly report: June 1994, 20:7260 (R;US)
Validation of tritium transport models for Li_2O, 20:9090 (R;US)
TRITIUM RECOVERY
Validation of tritium transport models for Li_2O, 20:9090 (R;US)
TRITIUM TARGET
A theoretical calculation of n-T scattering cross sections, 20:8899 (RA;CN)
TRITON REACTIONS
CFUP1- a program for calculating neutron or charged particle induced reactions on fissile nuclei in energy range up to 35 MeV, 20:9156 (RA;CN)
CMUP2- a program for calculating neutron or charged particle induced reactions in energy range up to 50 MeV, 20:9155 (RA;CN)
TRU WASTES
See ALPHA-BEARING WASTES
TRUCKS
Rollover analysis of rotary mode core sampler truck No. 2, 20:7501 (R;US)
TRX-1
See REVERSE-FIELD PINCH
TSCHEBYSCHEFF APPROXIMATION
See POLYNOMIALS
TSL PROCESS
Advanced direct coal liquefaction concepts. Quarterly report, April 1–June 30, 1994, 20:7127 (R;US)
TUBES
See also PRESSURE TUBES
Development of non-destructive testing technology for the crack-like defects of steam generator tubes (II), 20:8262 (R;KR;In Korean)
Heat-rate improvements obtained by retubing condensers with new, enhanced tube types, 20:7627 (R;US)
Inconel alloys development -Development of the advanced nuclear materials-, 20:8101 (R;KR;In Korean)
TUBES (CONDUITS)
See PIPES
TUFF
Identification of potential groundwater flow paths using geological and geophysical data, 20:8650 (R;US)
TUMORS
See NEOPLASMS
TUNGSTEN
New novel cleaning technique for extending mean time between mechanical cleans in a Genus tungsten CVD reactor, 20:8106 (R;US)
X-ray photoelectron spectroscopy analysis of cleaning procedures for synchrotron radiation beamline materials at the Advanced Photon Source, 20:8332 (R;US)
TUNGSTEN BASE ALLOYS
A study of the electrochemical behavior in tungsten and caustic solutions and platinum/iridium in chloride solutions, informal report, 20:8072 (R;US)
TUNNEL EFFECT
Quantum tunnelling and Heisenberg equation of motion, 20:8729 (IA;IR;In English, Persian)
TURBINE BLADES
Lightning flashes to non-conductive (fibre glass) rotor blades of wind turbines, 20:7615 (RA;DK)
Lightning protection of large rotor blades design and experience, 20:7614 (RA;DK)
Lightning tests on windmill blades, 20:7618 (RA;DK)
Verification of design basis 2 - a coupled aeroelastic wind turbine model, 20:7624 (R;DK)
TURBINES
See also STEAM TURBINES
WIND TURBINES
Field investigations examining the impact of supersaturated vapor expansions on turbine performance, 20:7608 (R;US)
TURBULENCE
A wavenumber-partitioning scheme for two-dimensional statistical closures, 20:8973 (R;US)
On inertial range scaling laws, 20:8974 (R;US)
TURBULENT FLOW
Experimental investigation of an equilibrium boundary layer in strong adverse pressure gradient, 20:8253 (R;NO)
Particle-turbulence interaction in dilute suspensions, 20:8259 (R;FI)
TWO-DIMENSIONAL ELECTROPHORESIS
[Cloning-idependent mapping technology for genomic fidelity, contig linking, C-DNA site analysis, and gene detection]. Final report, 20:8582 (R;US)
TYBO EVENT
See NUCLEAR EXPLOSIONS
UNDERGROUND EXPLOSIONS
3-DIMENSIONAL CALCULATIONS
See THREE-DIMENSIONAL CALCULATIONS
2-METHYLPROPANOL
Development of a catalyst for conversion of syngas-derived materials to isobutylene. Quarterly report number 11, October 1–December 31, 1993, 20:7563 (R;US)
High octane ethers from synthesis gas-derived alcohols. Quarterly technical progress report, January–March, 1993, 20:7564 (R;US)
2-PROPANOL
See PROPANOLS

U

UCLBL
See LAWRENCE BERKELEY LABORATORY

UCLLL
See LAWRENCE LIVERMORE LABORATORY

UHDE-PFIRRMANN PROCESS
See COAL LIQUEFACTION

UINTA BASIN
Green River Formation water flood demonstration project, Uinta Basin, Utah. Quarterly technical progress report, July 1–September 30, 1994, 20:7216 (R;US)

ULTRACOLD NEUTRONS
Production and Storage of Ultracold Neutrons at Pulse Neutron Sources with Low Repetition Rates, 20:7521 (R;XJ)

ULTRAVIOLET RADIATION
Influence of recD1013 and recJ284 mutations of Escherichia coli on indirect recombinogenesis of lambda phage., 20:8614 (I;MX;In Spanish)

UNCERTAINTY
See DATA COVARIANCES

UNDERGROUND DISPOSAL
Fire hazard analysis for the Westinghouse Hanford Company managed low-level mixed waste Trench 31 and 34, 20:7502 (R;US)

UNDERGROUND EXPLOSIONS
Recording experiment on Rainier Mesa in conjunction with a reflection survey, 20:8422 (R;US)

UNDERGROUND HEAT DISTRIBUTION SYSTEMS
See HEAT DISTRIBUTION SYSTEMS

UNDERGROUND STORAGE
Subsurface barrier verification technologies, informal report, 20:7290 (R;US)
Supai salt karst features: Holbrook Basin, Arizona, 20:7246 (R;US)

UNDERWATER VEHICLES
See SUBMARINES

UNDULATORS
See WIGGLER MAGNETS

UNIFIED GAUGE MODELS
See also WEINBERG LEPTON MODEL
WEINBERG-SALAM GAUGE MODEL
Two-loop vacuum amplitudes in a non-Abelian gauge theory on S_4, 20:8743 (R;AU)

UNIFIED-FIELD THEORIES
See also KOBAYASHI-MASKAWA MATRIX
WEINBERG-SALAM GAUGE MODEL
Supersymmetry, 20:8734 (R;US)

UNION OF SOVIET SOCIALIST REPUBLICS
See USSR

UNITED KINGDOM
Analysis of the trend in international nuclear affairs -With reference to nuclear policy development in the UK-, 20:7883 (R;KR;In Korean)
Plutonium arisings and utilization in the United Kingdom, 20:7274 (RA;XA)

UNITED STATES OF AMERICA
See USA

UNIVERSE
The influence of CDM on the dynamical estimate of Ω in the local neighborhood, 20:8703 (R;US)

UNIVERSITIES
See EDUCATIONAL FACILITIES

UNIVERSITY OF CALIFORNIA LAWRENCE RADIATION LABORATORY
See LAWRENCE BERKELEY LABORATORY

UNSOLICITED PROPOSALS
See PROPOSALS

URANIUM
See also NATURAL URANIUM
An assessment of high-energy explosives and metal contamination in soil at TA-67 (12), L-Site, and TA-14, Q-Site, 20:8420 (R;US)
Core scanning for Th, U and K. Problems and solutions, 20:8469 (R;DK)
Photon flux optimization in three-color multiphoton ionization of uranium atoms, 20:8954 (RA;IL)
Soil treatment to remove uranium and related mixed radioactive heavy metal contaminants. Seventh quarterly technical progress report, July 1, 1994–September 30, 1994, 20:8470 (R;US)
Thermodynamic modeling of hydrogen fluoride production relevant to actinide residue treatment, 20:7263 (R;US)
Uranium-contaminated soils: Ultramicrotomy and electron beam analysis, 20:7441 (R;US)

URANIUM 235
Determination of U-235 enrichment on uranium materials by gamma spectrometry., 20:8162 (IA;MX)
Neutron scattering studies in the actinide region. Progress report, August 1, 1991–July 31, 1994, 20:8906 (R;US)
Tank 41H bounding uranium enrichment. Revision 1, 20:7506 (R;US)
The summary for recommended data of natural Zn, ^{232}Th and ^{235}U for CENDL-2, 20:8896 (RA;CN)

URANIUM 238
Revision on recommended data of ^{238}U for CENDL-2, 20:8904 (RA;CN)

URANIUM 238 TARGET
Optical model parameters and fast neutron small angles scattering cross sections, 20:8898 (RA;CN)

URANIUM ALLOYS
See also URANIUM BASE ALLOYS
Coexistence of three commensurate magnetic phases in the solid solution $U(Ni_{0.25}Cu_{0.75})_2Si_2$, observed by neutron diffraction, 20:8082 (RA;IL)
Magnetic ordering in $(U_{0.5}Tb_{0.5})Co_2Ge_2$, studies by ac-susceptibility and neutron-diffraction measurements, 20:8983 (RA;IL)
Magnetic properties of $U(Ni_{1-x}Cu_x)_2Si_2$ solid solutions in the vicinity of x = 0.5 studied by neutron diffraction and ac-susceptibility, 20:8121 (RA;IL)
Neutron diffraction and ac-susceptibility studies of the $U(Ni_{1-x}Cu_x)_2Si_2$ system, 20:8122 (RA;IL)

URANIUM BASE ALLOYS
Shear-like transformation in dilute U-W alloys, 20:8087 (RA;IL)

URANIUM COMPOUNDS
See also URANIUM OXIDES
URANIUM SILICIDES
Neutron diffraction and ac-susceptibility studies of the $U(Ni_{1-x}Cu_x)_2Si_2$ system, 20:8122 (RA;IL)
$UCoNiGe_2$ nonmagnetic solid solution of the antiferromagnets UCo_2Ge_2 and UNi_2Ge_2, 20:8081 (RA;IL)

URANIUM DEPOSITS
Application of gas geochemistry in the search for different types of uranium deposits. Final report for the period 15 November 1991 - 15 March 1994, 20:7262 (R;XA)
Final report of the AECL/SKB Cigar Lake analog study, 20:7358 (R;SE)

URANIUM DIOXIDE
Long-term safety of radioactive waste disposal: Reaction of high burnup spent fuel and UO_2 in saline brines at room temperature, 20:8126 (R;DE)

URANIUM HEXAFLUORIDE
Atmospheric corrosion monitoring at the US Department of Energy's Oak Ridge K-25 Site, 20:7296 (R;US)

URANIUM MILLS
See FEED MATERIALS PLANTS

URANIUM MINES
A new monitoring network in the surroundings of old uranium mine spoil banks in the Pribram district sites, 20:8453 (IA;CZ;In Czech)
Addressing the environmental burden remained after uranium surveying, mining and milling, 20:7448 (IA;CZ;In Czech)
Geological environmental problems in the surroundings of the Olsi uranium deposit, 20:7449 (IA;CZ;In Czech)

International comparison of environmental protection provisions in remedial actions on uranium mine and mill tailings, 20:8492 (IA;CZ;In German)
The Institute's view of the use of wastes for environmental remedial actions and land reclamation, 20:8493 (IA;CZ;In Czech)
The mining Pribram in science and technology. Section O: Mining and the environment, 20:7446 (I;CZ;In Czech)

URANIUM OXIDES
See also URANIUM DIOXIDE
Criticality safety evaluation report for the 100 KE Basin sandfilter backwash pit, 20:7375 (R;US)

URANIUM SILICIDES
A phenomenological model for the effect of nanocrystalline microstructure on irradiation-induced amorphization in U_3Si, 20:8112 (R;US)
Magnetic properties of $U(Ni_{1-x}Cu_x)_2Si_2$ solid solutions in the vicinity of x = 0.5 studied by neutron diffraction and ac-susceptibility, 20:8121 (RA;IL)

URBAN AREAS
See also NEW YORK CITY
Blazing the energy trail: The Municipal Energy Management Program, 20:8044 (R;US)
Cadastre of discharges into bodies of water. Direct discharges. Year of survey: 1986, 20:8540 (R;DE;In German)
Cost-effective environmental policy to environmental problems from the transportation sector in cities, 20:7857 (R;NO;In Norwegian)
Methods of valuing air pollution and estimated monetary values of air pollutants in various U.S. regions, 20:7849 (R;US)

URETHANE
Water-blown rigid urethane foam for thermal insulation, 20:8036 (RA;US)

US CLEAN AIR ACT
See CLEAN AIR ACTS

US DOD
Staff exchange with Spokane Intercollegiate Research and Technology Institute (SIRTI), final project report, 20:7878 (R;US)

US DOE
See also ANL
BNL
BATTELLE PACIFIC NORTHWEST LABORATORIES
FEED MATERIALS PRODUCTION CENTER
HANFORD RESERVATION
IDAHO NATIONAL ENGINEERING LABORATORY
LANL
LASL
LAWRENCE BERKELEY LABORATORY
LAWRENCE LIVERMORE LABORATORY
LAWRENCE LIVERMORE NATIONAL LABORATORY
NATIONAL RENEWABLE ENERGY LABORATORY
NEVADA TEST SITE
ORGDP
ORNL
OAK RIDGE RESERVATION
PANTEX PLANT
SANDIA LABORATORIES
SANDIA NATIONAL LABORATORIES
SAVANNAH RIVER PLANT
WIPP
Audit of administration of the Department of Energy's small disadvantaged business program, 20:9130 (R;US)
Biologically produced succinic acid: A new route to chemical intermediates, 20:7543 (R;US)
Clean fractionation of biomass, 20:7544 (R;US)
FY 1996 Congressional budget request: Budget highlights, 20:7869 (R;US)
Implementing the theories: A fully integrated project control system that's implemented and works, 20:9132 (R;US)
Report on the inspection of the status of the disposal of technical Surveillance Equipment at the Central Training Academy, Albuquerque, New Mexico, 20:9131 (R;US)
Staff exchange with Spokane Intercollegiate Research and Technology Institute (SIRTI), final project report, 20:7878 (R;US)
Summaries of FY 1994 engineering research, 20:7871 (R;US)
Technology transfer 1995, 20:7874 (R;US)
The AMTEX Partnership™. Fourth quarter report, September 1994, 20:7877 (R;US)
Transition report, United States Department of Energy: A report to the President-Elect. Volume 1, 20:7872 (R;US)
Transition report, United States Department of Energy: A report to the President-Elect. Volume 2, 20:7873 (R;US)
Transportation and packaging resource guide, 20:7282 (R;US)
Turning research into results, final report, 20:7961 (R;US)

US DOT
Transportation and packaging resource guide, 20:7282 (R;US)

US EPA
Classification of groundwater at the Nevada Test Site, 20:8471 (R;US)
Transportation and packaging resource guide, 20:7282 (R;US)

US GULF COAST
CO_2 Huff-n-Puff process in a light oil shallow shelf carbonate reservoir. Quarterly technical progress report, 3rd quarter, 1994, 20:7224 (R;US)

US NRC
Budget estimates - fiscal years 1996-1997, 20:7682 (R;US)
Regulatory and technical reports (abstract index journal): Compilation for third quarter 1994, July–September. Volume 19, Number 3, 20:7681 (R;US)
Transportation and packaging resource guide, 20:7282 (R;US)

US RESOURCE RECOVERY ACTS
See RESOURCE RECOVERY ACTS

US SUPERFUND
Approach and strategy for performing ecological risk assessments for the U.S. Department of Energy's Oak Ridge Reservation: 1994 revision, 20:7473 (R;US)
CERCLA §103 and EPCRA §304 Release Notification Requirements update, 20:7852 (R;US)
Catalog of CERCLA applicable or relevant and appropriate requirements (ARARs) - fact sheets, 20:7859 (R;US)
Environmental monitoring plan, July 1–December 31, 1994, 20:7855 (R;US)
Environmental monitoring report, May 10, 1993–June 1, 1994, 20:7854 (R;US)

USA
See also ALABAMA
ARIZONA
CALIFORNIA
FLORIDA
IDAHO
MICHIGAN
MONTANA
NEVADA
NEW JERSEY
NEW MEXICO
NORTH DAKOTA
OKLAHOMA
SOUTH DAKOTA
TENNESSEE
US GULF COAST
UTAH
WASHINGTON
Description of electric energy use in commercial buildings in the Pacific Northwest: 1992 Supplement. End-use Load and Consumer Assessment Program (ELCAP), 20:8018 (R;US)
Transportation technology transitions and macroeconomic growth – Contemporary evidence, 20:8010 (R;US)

USSR
The cascade of reservoirs of the "Mayak" Plant: Case history and the first version of a computer simulator, 20:7479 (R;US)

UTAH
Community radiation monitoring program. Annual report, October 1, 1992–September 30, 1993, 20:8435 (R;US)
Geological and petrophysical characterization of the Ferron Sandstone for 3-D simulation of a fluvial-deltaic reservoir. Quarterly report, July 1–September 30, 1994, 20:7192 (R;US)

V

V CODES
Vault Safety and Inventory System users manual, PRIME 2350. Revision 1, 20:7512 (R;US)

V-1 REACTOR (BOHUNICE)
See BOHUNICE V-1 REACTOR

V-2 REACTOR (BOHUNICE)
See BOHUNICE V-2 REACTOR

VACUUM SYSTEMS
Photon stimulated desorption (PSD) measurements of extruded copper and of welded copper beam chambers for the PEP II asymmetric B-factory, 20:8333 (R;US)
The development of a positron ionization gauge, 20:8415 (R;US)
Vacuum system design, 20:8334 (IA;XC)
X-ray photoelectron spectroscopy analysis of cleaning procedures for synchrotron radiation beamline materials at the Advanced Photon Source, 20:8332 (R;US)

VALENCE ELECTRONS
See ELECTRONS

VALVES
BCP selector valves and limit switches, 20:7381 (R;US)

VANADIUM
Epitaxial growth of bcc transition metal films and superlattices onto MgO (111), (011) and (001) substrates, 20:8071 (R;US)

VANADIUM BASE ALLOYS
Effect of dynamically charged helium on mechanical properties of vanadium-base alloys, 20:9093 (R;US)
Swelling and structure of vanadium-base alloys irradiated in the dynamic helium charging experiment, 20:8070 (R;US)

VANADIUM MINERALS
See MINERALS

VAPOR INCINERATORS
See AFTERBURNERS

VAPORS
See also WATER VAPOR
Tank 241-TX-105 tank characterization plan, 20:7419 (R;US)
Tank vapor mitigation requirements for Hanford Tank Farms, 20:7387 (R;US)

VECTOR FIELDS
Bifurcations of contracting singular cycles, 20:8666 (R;XA)
Exact smooth classification of Hamiltonian vector fields on symplectic 2-manifolds, 20:8673 (R;XA)

VEGETATION
See PLANTS

VEHICLES
See also AUTOMOBILES
BUSES
ELECTRIC-POWERED VEHICLES
SPACE VEHICLES
TRUCKS
Study on the CNG storage method using activated adsorbent and CNG combustion technology for vehicles, 20:8012 (R;KR;In Korean)

VELOCIMETERS
Fluorescent image tracking velocimeter, 20:8592 (PA;US)

VELOCITY-PUMPS REACTION TURBINES
See TURBINES

VENTILATION DUCTS
See DUCTS

VENTILATION SYSTEMS
Human Reliability Analysis for In-Tank Precipitation Alignment and Startup of Emergency Purge Ventilation Equipment. Revision 3, 20:7505 (R;US)

VENTS
Development of oil heat chimney venting tables, 20:7958 (RA;US)
Results of the validation of the oil heat vent analysis program (OHVAP), 20:7957 (RA;US)

VESSELS
See CONTAINERS

VESSELS (CHEMICAL REACTIONS)
See CHEMICAL REACTORS

VESSELS (PRESSURE)
See PRESSURE VESSELS

VESSELS (REACTOR)
See REACTOR VESSELS

VIRTUAL STATES
Form Factor of the Process $\gamma^*\gamma^* \rightarrow \pi^0$ for Small Virtuality of One of the Photons and QCD Sum Rules (2): Sum Rule, 20:8764 (R;XJ)

VISITOR CENTERS
See PUBLIC BUILDINGS

VITRIFICATION
Development of a Transportable Vitrification System for Mixed Waste, 20:7432 (R;US)

VLASOV EQUATION
See BOLTZMANN-VLASOV EQUATION

VLASOV INSTABILITY
See BOLTZMANN-VLASOV EQUATION

VOC
See ORGANIC COMPOUNDS
VOLATILE MATTER

VOCATIONAL TRAINING
See TRAINING

VOLATILE MATTER
Passive control of VOCs using valved well heads: FY1994 report, 20:7508 (R;US)
Sustainability: ecology comes of age, 20:7838 (IA;CH)

VOLTAIC CELLS
See ELECTRIC BATTERIES

VR-1 REACTOR
Vol. 2: Experimental education methods, 20:9136 (I;CZ;In Czech)
Vol. 4: Technical descriptions of Czechoslovak research reactors. Part 3. Technical description of the VR-1 reactor (Instruction texts and problems for the training and examination of selected personnel at research nuclear facilities.), 20:7770 (I;CZ;In Czech)

W

W CODES
Validation of the WIMSD4M cross-section generation code with benchmark results, 20:7761 (R;US)

W MINUS BOSONS
Extending the kinematic range for W_R searches in e^-e^- collisions at the NLC, 20:8806 (R;US)

W PLUS BOSONS
Extending the kinematic range for W_R searches in e^-e^- collisions at the NLC, 20:8806 (R;US)
Supersymmetric magnetic moments sum rules and spontaneous supersymmetry breaking, 20:8830 (R;XA)

WAGON WHEEL EVENT
See CONTAINED EXPLOSIONS
NUCLEAR EXPLOSIONS

WARFARE
See also CHEMICAL WARFARE
Squeezing out all the performance: Using Ingres for a C^{3}I reporting system, 20:8417 (R;US)

WASHINGTON
Blue Creek Winter Range: Wildlife Mitigation Project. Final environmental assessment, 20:7579 (R;US)

WASTE BURIAL
See UNDERGROUND DISPOSAL

WASTE CHEMICALS
See CHEMICAL WASTES

WASTE FORMS
Vitrification of high sulfate wastes, 20:7350 (R;US)

WASTE ISOLATION PILOT PLANT
See WIPP

WASTE MANAGEMENT
See also RADIOACTIVE WASTE MANAGEMENT
WASTE PROCESSING
Environmental Hazards Assessment Program. Quarterly report, October–December 1994, 20:7853 (R;US)
Infrastructure support for the Waste Management Institute at North Carolina A&T State University. Progress report, September 1994–January 1995, 20:7307 (R;US)

Savannah River Technology Center monthly report: August 1994, 20:7261 (R;US)
Savannah River Technology Center monthly report: June 1994, 20:7260 (R;US)
Virtual reality and stereoscopic telepresence, 20:7491 (R;US)

WASTE PROCESSING
See also MATERIALS RECOVERY
RADIOACTIVE WASTE PROCESSING
A summary of the report on prospects for pyrolysis technologies in managing municipal, industrial, and Department of Energy cleanup wastes, 20:8041 (R;US)
Analysis of glycerin waste in A-Area sanitary treatment facility material, 20:7436 (R;US)

WASTE PROCESSING PLANTS
Pollution prevention opportunity assessment for the SNL/California waste management facilities, 20:7357 (R;US)
Rejuvenation and recovery of electroplating acids using the WADR technology, 20:8038 (R;US)

WASTE SOLUTIONS
See LIQUID WASTES

WASTE TREATMENT
See WASTE PROCESSING

WASTE WATER
9. International symposium on nuclear chemistry, radiochemistry and radiation chemistry. Abstracts, 20:8214 (I;MX)
A study on the treatment of industrial wastewater containing heavy metals, 20:8170 (R;KR;In Korean)
A study on the treatment of industrial wastewater containing heavy metals, 20:8189 (R;KR;In Korean)
A study on the treatment of non-biodegrable wastewater by using radiation, 20:8211 (R;KR;In Korean)
Development of a cost effective environment compliance technology for stripper brine wells. Quarterly report, July 1, 1994–September 30, 1994, 20:7239 (R;US)
Evaluation of the freeze-thaw/evaporation process for the treatment of produced waters. Quarterly technical progress report, July 1, 1994–September 30, 1994, 20:7240 (R;US)
Reactive liquid/liquid extraction of heavy metals from landfill seepage waters. Its characterisation and application, 20:8542 (R;DE;In German)
Study on treatment of wastewater containing plutonium in CIAE (China Institute of Atomic Energy), 20:7292 (R;CN;In Chinese)

WASTE-FUELED POWER PLANTS
See REFUSE-FUELED POWER PLANTS

WASTEFORMS
See WASTE FORMS

WATER
See also DRINKING WATER
FRESH WATER
GROUND WATER
HEAVY WATER
HOT WATER
RAIN WATER
SEAWATER
WASTE WATER
Cooling and air conditioning with water/zeolite, 20:7996 (RA;US)
Fundamental mechanisms in flue gas conditioning. Quarterly report, July 1994–September 1994, 20:7156 (R;US)
Mass transfer model for two-layer TBP oxidation reactions, 20:7437 (R;US)
Raman spectroscopic studies in supercritical water, 20:8055 (R;US)
Time-resolved EPR studies of the H atom: A stable heavy isotope of muonium, 20:8196 (R;US)
Water as refrigerant and secondary refrigerant: Technologies for the production of chilled water and ice-slurries, 20:7999 (RA;US)
Water levels in wells J-11 and J-12, 1989-91, Yucca Mountain Area, Nevada, 20:7454 (R;US)

WATER COOLANT
See WATER

WATER COOLED GRAPHITE MODERATED REACTORS
See LWGR TYPE REACTORS

WATER COOLED REACTORS
See also BWR TYPE REACTORS
LWGR TYPE REACTORS
PWR TYPE REACTORS
TRIGA TYPE REACTORS
CONTAIN independent peer review, 20:7817 (R;US)
Chemistry in water reactors, 20:8219 (R;SE;In Swedish)
Core damage frequency observations and insights of LWRs based on the IPEs, 20:7649 (R;US)
Production and testing of the VITAMIN-B6 fine group and the BUGLE-93 broad-group neutron/photon cross-section libraries derived from ENDF/B-VI nuclear data, 20:7648 (R;US)

WATER HEATERS
See also SOLAR WATER HEATERS
Development of evacuated panel thermal insulations, 20:7990 (RA;US)
Final report, exhaust air heat pump monitoring study, 20:8019 (R;US)

WATER MODERATED REACTORS
See also BWR TYPE REACTORS
PWR TYPE REACTORS
TRIGA TYPE REACTORS
Validation of the WIMSD4M cross-section generation code with benchmark results, 20:7761 (R;US)

WATER MODERATOR
See WATER

WATER POLLUTION
Contaminant transport at a waste incinerator residue deposit. 2D hydrogeochemical modelling, 20:8507 (RA;DK)

WATER POLLUTION ABATEMENT
Inventory and sensitivity mapping in the German Wadden Sea. June 1987 - June 1993. Final report, 20:8530 (R;DE;In German)

WATER QUALITY
P-Area Acid/Caustic Basin groundwater monitoring report, second quarter 1994, 20:7507 (R;US)

WATER RESOURCES
Water Science and Technology Board. Annual report 1991, 20:8525 (R;US)
Water Science and Technology Board. Annual report 1992-1993, 20:8526 (R;US)
Water Science and Technology Board. Annual report 1993-1994, 20:8527 (R;US)

WATER SOLUTIONS
See AQUEOUS SOLUTIONS

WATER TREATMENT PLANTS
Bench-scale treatability studies for simulated incinerator scrubber blowdown containing radioactive cesium and strontium, 20:7335 (R;US)

WATER VAPOR
Study on the interaction of lithium orthosilicate with water vapor and hydrogen, 20:9122 (R;DE;In German)

WATER WELLS
Potential hydrologic characterization wells in Amargosa Valley, 20:8473 (R;US)
Water levels in wells J-11 and J-12, 1989-91, Yucca Mountain Area, Nevada, 20:7454 (R;US)

WATERBORNE PARTICLES
See PARTICULATES

WATERFLOODING
See also CAUSTIC FLOODING
Detailed evaluation of the West Kiehl alkaline-surfactant-polymer field project and it's application to mature Minnelusa waterfloods. Technical progress report, July–September, 1994, 20:7203 (R;US)
Surfactant loss control in chemical flooding: Spectroscopic and calorimetric study of adsorption and precipitation on reservoir minerals. Quarterly technical progress report, July 1, 1994–October 31, 1994, 20:7211 (R;US)

WAVEGUIDES
Lensing duct, 20:8414 (PA;US)

WAVELENGTHS
Development of laser technology (Development of the wavelength tuning and the output stabilization technology), 20:8231 (R;KR;In Korean)

WAZ 16
See NICKEL BASE ALLOYS
WEAK INTERACTIONS
Renormcharges in V-A Theories, 20:8798 (R;XJ)
WEAPONS
See also BOMBS
CHEMICAL WARFARE AGENTS
NUCLEAR WEAPONS
Facility agreements under the chemical weapons convention inspections, 20:8418 (R;US)
WECS
See WIND TURBINES
WEINBERG LEPTON MODEL
Electroweak interactions on the lattice, 20:8750 (R;AU)
Renormalization group analyses of particle masses in full four-generation fermion condensate scheme, 20:8756 (R;XA)
WEINBERG MODEL
See WEINBERG LEPTON MODEL
WEINBERG-SALAM GAUGE MODEL
Precision electroweak physics with the SLD/SLC: The left-right polarization asymmetry, 20:8770 (R;US)
WELDING MACHINES
Simulation and stability testing of the fuzzy control of an implant welding unit, 20:8079 (R;DE;In German)
WELLS
See also ABANDONED WELLS
INJECTION WELLS
NATURAL GAS WELLS
OIL WELLS
WATER WELLS
Summary report of Hanford Site well remediation and decommissioning activities for fiscal year 1994, 20:7493 (R;US)
WEST GERMANY
See FEDERAL REPUBLIC OF GERMANY
WESTERN REGION
See USA
WET-TYPE COOLING TOWERS
See COOLING TOWERS
WETLANDS
Pipeline corridors through wetlands - impact on plant communities: Mill Creek Tributary Crossing, Jefferson County, New York, 1991 survey. Topical report, June 1991–April 1993, 20:7252 (R;US)
Pipeline corridors through wetlands – Impacts on plant communities: Little Timber Creek Crossing, Gloucester County, New Jersey. Topical report, August 1991–January 1993, 20:7253 (R;US)
Pipeline corridors through wetlands – Impacts on plant communities: Norris Brook Crossing Peabody, Massachusetts, 20:7254 (R;US)
WIGGLER MAGNETS
Operation of a small-gap undulator on the NSLS X-ray Ring, 20:8312 (R;US)
Undulators for short wavelength FEL amplifiers, 20:8270 (R;US)
WILD ANIMALS
Blue Creek Winter Range: Wildlife Mitigation Project. Final environmental assessment, 20:7579 (R;US)
Chernobyl cesium in the Swedish moose population: Effect of age, diet and habitat selection, 20:8508 (R;SE)
Estimating exposure of terrestrial wildlife to contaminants, 20:8641 (R;US)
Fall 1994 wildlife and vegetation survey, Norton Air Force Base, California, 20:8511 (R;US)
WILLOWS
Frost resistance in Salix, 20:7538 (R;SE)
WILPUTTE PROCESS
See COAL GASIFICATION
WIND
Detailed survey of wind energy on Cheju Province for the feasibility study of wind farm(II), 20:7979 (R;KR;In Korean)
WIND ENERGY CONVERSION SYSTEMS
See WIND TURBINES
WIND FARMS
See WIND TURBINE ARRAYS
WIND GENERATORS
See ELECTRIC GENERATORS
WIND TURBINES
WIND POWER
Appendix model performance - model documentation renewable fuels module of the National Energy Modeling System, 20:7886 (R;US)
Wind energy market study Eastern Europe. Czech and Slovak Republics, 20:7609 (R;DK)
Wind energy market study Eastern Europe. Poland, 20:7610 (R;DK)
WIND POWER PLANTS
Hourly simulations of hybrid renewable energy systems for San Cristobal/Santa Barbara, Guatemala, 20:8049 (R;US)
Lightning and the impact on wind turbine generation, 20:7613 (RA;DK)
WIND TURBINE ARRAYS
Detailed survey of wind energy on Cheju Province for the feasibility study of wind farm(II), 20:7979 (R;KR;In Korean)
Lightning protection of wind turbine generator systems. Service experience from Norway and proposed solutions to reduce lightning damage, 20:7612 (RA;DK)
WIND TURBINES
See also HORIZONTAL AXIS TURBINES
A methodology for the evaluation of lightning protection measures for wind turbine generating stations, 20:7626 (RA;DK)
Current distribution and indirect effects on a wind power generator following a lightning stroke, 20:7616 (RA;DK)
Earthing of wind farms - a report of work in progress, 20:7619 (RA;DK)
Evaluation of the damages caused by lightning current flowing through bearings, 20:7625 (RA;DK)
GPP user's guide - a general-purpose postprocessor for wind turbine data analysis, 20:7622 (R;US)
Lightning protection of wind turbine generator systems and EMC problems in the associated control systems, 20:7611 (R;DK)
Lightning stroke simulation by means of a leader progression model, 20:7617 (RA;DK)
Wind technology development: Large and small turbines, 20:7620 (R;US)
WINDOWS
Development of processing technique for the electrochromic window, 20:7973 (R;KR;In Korean)
The design and evaluation of integrated envelope and lighting control strategies for commercial buildings, 20:7981 (R;US)
Windows and daylighting: A brighter outlook, 20:7963 (R;US)
WIPP
Evolution of patterns of regional groundwater flow in southeastern New Mexico: Response to post-Pleistocene changes in climate, 20:7294 (R;US)
Non-Salado flow and transport position paper. Revision 1, 20:7293 (R;US)
WIRES
See also SUPERCONDUCTING WIRES
Practical superconductor development for electrical power applications, annual report for FY 1994, 20:8268 (R;US)
WOLFRAM
See TUNGSTEN
WOOD ALCOHOL
See METHANOL
WOOD FUELS
A handbook for small-scale densified biomass fuel (pellets) manufacturing for local markets, 20:7539 (R;US)
Research projects in 1994, 20:7541 (R;FI;In Finnish, English)
Shaft furnace gasification with regard to cogeneration of heat and power. Partial report no 5 - Final report. Gasification of wood chips - test 8-9. Gasification of straw - test 10-14, 20:7550 (R;DK;In Danish)
WOOD OILS
Baseline NO_x emissions during combustion of wood-derived pyrolysis oils, 20:7560 (R;US)
WOOD-FUEL POWER PLANTS
Market conditions for wind power and biofuel-based cogeneration, 20:7561 (R;SE;In Swedish)

WORCESTER POLYTECHNIC INSTITUTE POOL REACTOR
See WPIR REACTOR

WORKERS
See PERSONNEL

WPIR REACTOR
Laboratory instrumentation modernization at the WPI Nuclear Reactor Facility, 20:7766 (R;US)

WWER TYPE REACTORS
See also BOHUNICE V-2 REACTOR
WWER-3 REACTOR
WWER-5 REACTOR
Creation of a computerized operator support system at Unit 5 of the Novovoronezh Nuclear Power Plant, 20:7729 (RA;XA)
Evaluation of the SMOLENSK-3 NPP shutdown system. Phase I: code implementation and testing. First progress report, 20:7667 (R;CH)
Functional design bases for a safety parameter display system for WWER-type reactors, 20:7721 (RA;XA)
NPPO - TINA: Expert system for supporting the operator's decision-making process, 20:7718 (RA;XA)
The development of WWER monitoring and diagnostic concept, 20:7730 (RA;XA)
The safety of WWER and RBMK nuclear power plants. Progress report on the IAEA extrabudgetary programme on the safety of WWER and RBMK nuclear power plants, 1992-1994, 20:7653 (R;XA)

WWER-1000 REACTOR
See WWER-5 REACTOR

WWER-3 REACTOR
Upgrading the VERONA core monitoring system, 20:7713 (RA;XA)

WWER-440 REACTOR
See WWER-3 REACTOR

WWER-5 REACTOR
The SPDS as a tool to improve post-accident strategy on WWER and RBMK reactors, 20:7719 (RA;XA)

WWER-500 REACTOR
See WWER-5 REACTOR

X

X RADIATION
X-ray laser studies using plasmas created by optical field ionization, 20:9084 (R;US)

X-2830 RESONANCES
See MESONS

X-RASERS
See X-RAY LASERS

X-RAY DIFFRACTION
Enhancing XRPD pattern quality with line profile fitting in multi-phase systems, 20:8155 (RA;IL)
Polarisation resonance in X-ray diffraction, 20:8990 (R;AU)

X-RAY DOSIMETRY
Early operating experience with large-area germanium detectors for detecting low-energy photons, 20:8633 (R;US)

X-RAY FLUORESCENCE ANALYSIS
Physics and archaeology an application of nuclear analytical technique, 20:8164 (IA;IR;In English, Persian)

X-RAY LASERS
Progress in compact soft x-ray lasers and their applications, 20:8275 (R;US)
Radiation transport and coherence in amplifying refractive systems, 20:8662 (RA;IL)
Study of amplified spontaneous emission systems by ray-tracing technique, 20:8663 (RA;IL)
X-ray laser studies using plasmas created by optical field ionization, 20:9084 (R;US)

X-RAY RADIOGRAPHY
The use of a CCD imaging system for X-ray film intensity measurement, 20:8331 (R;AU)

XENON
Evaluation of the SMOLENSK-3 NPP shutdown system. Phase I: code implementation and testing. First progress report, 20:7667 (R;CH)

XENON IONS
The interactions of high-energy, highly charged Xe ions with buckyballs, 20:8958 (R;US)

Y

YANKEE EVENT
See NUCLEAR EXPLOSIONS

YEARS LIVING RADIOISOTOPES
See also ALUMINIUM 26
AMERICIUM 241
BERYLLIUM 10
CALIFORNIUM 249
CESIUM 137
COBALT 60
CURIUM 248
LEAD 204
PLUTONIUM 239
PLUTONIUM 240
SAMARIUM 147
STRONTIUM 90
TECHNETIUM 99
THORIUM 232
TRITIUM
URANIUM 235
URANIUM 238
Development of Long-lived radionuclide handling technology - Development of Long-lived radionuclide transmutation technology-, 20:8621 (R;KR;In Korean)
Development of Long-lived radionuclide partitioning technology -Development of Long-lived radionuclide transmutation technology, 20:8188 (R;KR;In Korean)

YTTERBIUM
Development of atomic spectroscopy technology, 20:8169 (R;KR;In Korean)
Development of the separation and manufacturing technology for medical and industrial stable isotopes by using laser, 20:7516 (R;KR;In Korean)

YTTRIUM ALUMINIUM GARNETS
See ALUMINIUM OXIDES

YTTRIUM OXIDES
Characterization of superconducting thin films by rutherford backscattering analysis, 20:8985 (IA;IR;In English, Persian)
Microstructure and composition of a SNS Josephson junction using $CaRuO_3$ as the metallic barrier, 20:9026 (R;US)
Processing of single- and multi-domain $YBa_2Cu_3O_x$ bulk materials for levitation applications by $Nd_{1+x}Ba_{2-x}Cu_3O_y$ seeding, 20:8118 (R;US)
Solution based synthesis of perovskite-type oxide films and powders, 20:8127 (R;US)
The real structure of columnar pinning centers in heavy-ion-irradiated cuprate superconductors, 20:8119 (R;US)
Zone refining of sintered, microwave-derived YBCO superconductors, 20:8116 (R;US)

YUCCA MOUNTAIN
Combined analysis of surface reflection imaging and vertical seismic profiling at Yucca Mountain, Nevada, 20:7329 (R;US)
Geohydrologic data collected from shallow neutron-access boreholes and resultant-preliminary geohydrologic evaluations, Yucca Mountain area, Nye County, Nevada, 20:7366 (R;US)
Progress on flow visualization and relative permeability measurement in transparent replicas of natural fractures from Yucca Mountain, 20:7330 (R;US)
Water levels in wells J-11 and J-12, 1989-91, Yucca Mountain Area, Nevada, 20:7454 (R;US)

Z

Z NEUTRAL BOSONS

A measurement of quark and gluon jet differences at the Z^0 resonance, 20:8807 (R;US)

A measurement of the left-right, forward-backward asymmetry for charm quarks using D^{*+} and D^+ mesons, 20:8816 (R;US)

A search for jet handedness in hadronic Z^0 decays, 20:8805 (R;US)

A search for jet handedness in hadronic Z^0 decays, 20:8813 (R;US)

A search for jet handedness in hadronic Z^0 decays, 20:8814 (R;US)

A search for jet handedness in hadronic Z^0 decays, 20:8813 (R;US)

A test of the flavor independence of strong interactions, 20:8817 (R;US)

A test of the flavor independence of strong interactions, 20:8808 (R;US)

Measurement of α_s from hadronic event observables at the Z^0 resonance, 20:8809 (R;US)

Measurement of α_s from hadronic event observables at the Z^0 resonance, 20:8804 (R;US)

Measurement of the charged multiplicity of $Z^0 \rightarrow b\bar{b}$ events, 20:8811 (R;US)

Multiplicity moments in e^+e^- annihilation into hadrons at the Z^0 resonance, 20:8810 (R;US)

The left-right forward-backward asymmetry of heavy quarks measured with jet charge and with leptons at the SLD, 20:8815 (R;US)

The search for the decay of Z boson into two gamma as a test of Bose statistics, 20:8822 (R;AU)

ZEA MAYS

See MAIZE

ZEOLITES

Cooling and air conditioning with water/zeolite, 20:7996 (RA;US)

Direct catalytic decomposition of nitric oxide. Quarterly technical progress report number 12, July–September, 1994, 20:8436 (R;US)

Zeolites - a high resolution electron microscopy study, 20:8128 (R;SE)

ZERO POWER REACTORS

See also IFR REACTOR

Vol. 4: Technical descriptions of Czechoslovak research reactors. Part 1. Technical description of the LVR-15 reactor (Instruction texts and problems for the training and examination of selected personnel at research nuclear facilities.), 20:7769 (I;CZ;In Czech)

ZHURAVLEV PROCESS

See COAL GASIFICATION

ZINC

The summary for recommended data of natural Zn, ^{232}Th and ^{235}U for CENDL-2, 20:8896 (RA;CN)

ZINC 61

Nuclear data sheets update for A = 61, 20:8851 (RA;CN)

ZINC COMPOUNDS

Heterogeneous catalytic process for alcohol fuels from syngas. Tenth quarterly technical progress report, April 1994–June 1994, 20:7566 (R;US)

ZINC HALIDE PROCESS

See COAL LIQUEFACTION

ZIRCONIUM OXIDES

Heterogeneous catalytic process for alcohol fuels from syngas. Ninth quarterly technical progress report, January 1994–March 1994, 20:7565 (R;US)

In situ tritium from Li_2O and Li_2ZrO_3 irradiated in a fast neutron flux: BEATRIX-II, Phase 1 and 2, 20:9124 (R;US)

Contract Number Index

Numbers assigned to DOE contracts announced in documents in this publication are listed. Contract numbers are sorted alphanumerically and list the primary corporate author of the document cited, the citation number, and the report number or other document identification.

Contract No.	Abstract No.	Report No.
AC02-76CH00016	**Argonne National Lab., IL (United States)**	
	20:8712	BNL–61142
	Brookhaven National Lab., Upton, NY (United States)	
	20:7290	BNL–61127
	20:7291	BNL-A–3259
	20:7542	BNL–52452
	20:7764	BNL–52443
	20:7780	BNL–60744
	20:7781	BNL-NUREG–61147
	20:7959	BNL–60978
	20:8041	BNL–61006
	20:8072	BNL–61136
	20:8119	BNL–60429
	20:8179	BNL–61084
	20:8225	BNL–52444
	20:8282	BNL–60283
	20:8283	BNL–61014
	20:8284	BNL–61267
	20:8299	BNL–60999
	20:8300	BNL–61007
	20:8310	BNL–52435
	20:8311	BNL–61019
	20:8312	BNL–61053
	20:8333	BNL–61082
	20:8415	BNL–61272
	20:8419	BNL–60818
	20:8431	BNL–61230
	20:8585	BNL–61079
	20:8595	BNL–61114
	20:8638	BNL–60883
	20:8646	BNL–52450
	20:8710	BNL–61011
	20:8711	BNL–61139
	20:8753	BNL–61179
	20:8824	BNL–61099
	20:8825	BNL–61141
	20:8879	BNL–60964
	20:8880	BNL–61074
	20:8981	BNL–61083
	20:9127	BNL–52351-Rev.12/94
	Sandia National Labs., Albuquerque, NM (United States)	
	20:7650	SAND–94-2170C
AC02-76CH03000	**Fermi National Accelerator Lab., Batavia, IL (United States)**	
	20:8347	FNAL/C–94/307
	20:8348	FNAL/C–94/379-E
	20:8689	FNAL/C–94/373
	20:8690	FNAL/C–94/397
	20:8785	FNAL/C–94/144-E
	20:8786	FNAL/C–94/209-E
	20:8787	FNAL/C–94/252-E
	20:8788	FNAL/C–94/293-E
	20:8789	FNAL/C–94/404-E
	20:8827	FNAL/C–94/337-E
	20:8828	FNAL/C–94/368-E
AC02-76CH03073	**Princeton Univ., NJ (United States). Plasma Physics Lab.**	
	20:8275	PPPL–3031
	20:8706	PPPL–3032
	20:9076	PPPL–2999
	20:9077	PPPL–3026
	20:9078	PPPL–3027
	20:9079	PPPL–3029
	20:9080	PPPL–3030
	20:9081	PPPL–3033
	20:9082	PPPL–3034
	20:9083	PPPL–3036
	20:9084	PPPL–3038
	20:9085	PPPL–3040
	20:9086	PPPL–3042
	20:9087	PPPL–3044
	20:9088	PPPL–3045
	20:9089	PPPL-CFP–3185
	20:9125	PPPL–3025
	Lawrence Berkeley Lab., CA (United States)	
	20:8335	LBL–35912
AC02-76ER03064	**Harvard Univ., Cambridge, MA (United States). Dept. of Physics**	
	20:8779	DOE/ER/03064–T2
	20:8780	DOE/ER/03064–T3
	20:8781	DOE/ER/03064–T4
	20:8782	DOE/ER/03064–T5
AC02-76ER03069	**Brookhaven National Lab., Upton, NY (United States)**	
	20:8880	BNL–61074
AC02-90CH10435	**USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States)**	
	20:8060	DOE/METC–94/1010
AC02-91CH10447	**USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States)**	
	20:8061	DOE/METC–94/1010
AC03-76SF00098	**Stanford Linear Accelerator Center, Menlo Park, CA (United States)**	
	20:8770	SLAC-PUB–6700
	Lawrence Berkeley Lab., CA (United States)	
	20:7326	LBL–34468
	20:7327	LBL–36385
	20:7328	LBL–36387
	20:7329	LBL–36467
	20:7330	LBL–36614
	20:7479	LBL–36212
	20:7480	LBL-PUB–3040-Rev.
	20:7605	LBL–36208
	20:7831	LBL–36293
	20:7981	LBL–34638
	20:7982	LBL–35982
	20:8027	LBL–36395
	20:8063	LBL–36383
	20:8103	LBL–34612
	20:8270	LBL–36055
	20:8295	LBL–36343
	20:8302	LBL–36024

Contract No.	Abstract No.	Report No.
	20:8303	LBL–36180
	20:8304	LBL–36233
	20:8305	LBL–36302
	20:8335	LBL–35912
	20:8392	LBL–36273
	20:8393	LBL–36287
	20:8422	LBL–35946
	20:8428	LBL–35944
	20:8460	LBL–34244-Rev.
	20:8461	LBL–36379
	20:8499	LBL–36211
	20:8591	LBL-PUB–3095-Rev.1
	20:8647	DOE/BC–95000129
	20:8651	LBL–36126
	20:8705	LBL–36050
	20:8734	LBL–36175
	20:8803	LBL–36353
	20:8844	LBL–35768
	20:9123	LBL–35635
	20:9179	LBL–35179
	20:9180	LBL–35238
AC03-76SF00515	**Oregon Univ., Eugene, OR (United States). Dept. of Physics**	
	20:8812	SLAC-PUB–6639
	Stanford Linear Accelerator Center, Menlo Park, CA (United States)	
	20:8150	SLAC–450
	20:8281	SLAC-PUB–6735
	20:8296	SLAC-PUB–6338
	20:8297	SLAC-PUB–6646
	20:8306	SLAC-PUB–6527
	20:8307	SLAC-PUB–6604
	20:8308	SLAC-PUB–6621
	20:8326	SLAC-PUB–95-6745
	20:8327	SLAC-PUB–6566
	20:8328	SLAC-PUB–6617
	20:8329	SLAC-PUB–6694
	20:8330	SLAC-PUB–6702
	20:8399	SLAC-PUB–6669
	20:8400	SLAC-PUB–6701
	20:8401	SLAC-PUB–6731
	20:8682	SLAC-PUB–6718
	20:8735	SLAC-PUB–6640
	20:8737	SLAC-PUB–6673
	20:8738	SLAC-PUB–6685
	20:8769	SLAC-PUB–6658
	20:8770	SLAC-PUB–6700
	20:8805	SLAC-PUB–6550
	20:8806	SLAC-PUB–6591
	20:8807	SLAC-PUB–6597
	20:8808	SLAC-PUB–6598
	20:8809	SLAC-PUB–6599
	20:8810	SLAC-PUB–6600
	20:8811	SLAC-PUB–6602
	20:8813	SLAC-PUB–6645
	20:8815	SLAC-PUB–6648
	20:8816	SLAC-PUB–6653
	20:8817	SLAC-PUB–6659
	20:8818	SLAC-PUB–6674
	20:8838	SLAC-PUB–6290
	20:8839	SLAC-PUB–6584
	20:8840	SLAC-PUB–6730
	20:9187	SLAC-PUB–6567
	Stanford Univ., CA (United States)	
	20:8736	SLAC-PUB–6662
	20:8804	SLAC-PUB–6549
	20:8814	SLAC-PUB–6647
	20:8950	SLAC-PUB–6625
AC03-86SF16006	**Martin Marietta Astro Space, King of Prussia, PA (United States)**	
	20:7680	PATENTS-US–A7989609
AC03-89ER51114	**General Atomics, San Diego, CA (United States)**	
	20:9048	GA-A–21834
	20:9049	GA-A–21872
AC03-91SF19090	**Combustion Engineering, Inc., Windsor, CT (United States)**	
	20:7652	DOE/SF/19090–T3
AC04-76DP00789	**Sandia National Labs., Albuquerque, NM (United States)**	
	20:7511	SAND–88-0824C
	20:8108	SAND–95-8455C
	20:8272	PATENTS-US–A7972820
	General Atomics, San Diego, CA (United States)	
	20:9049	GA-A–21872
	Telluride Academy, CO (United States)	
	20:8576	CONF-9307199–Extd.Absts.
AC04-91AL65030	**Mason and Hanger-Silas Mason Co., Inc., Amarillo, TX (United States)**	
	20:7442	DOE/AL/65030–9413
AC04-94AL85000	**Nuclear Regulatory Commission, Washington, DC (United States). Office of Nuclear Regulatory Research**	
	20:7820	NUREG/CR–6134
	20:7821	NUREG/CR–6135
	Sandia National Labs., Albuquerque, NM (United States)	
	20:7246	SAND–94-3093C
	20:7293	CONF-9401111–1-Rev.1
	20:7294	CONF-941088–1
	20:7488	SAND–94-1718C
	20:7587	SAND–94-1546C
	20:7588	SAND–94-1557C
	20:7589	SAND–94-1562C
	20:7590	SAND–94-1563C
	20:7591	SAND–94-1570C
	20:7592	SAND–94-1571C
	20:7593	SAND–94-1597C
	20:7594	SAND–94-1613C
	20:7595	SAND–94-3077C
	20:7596	SAND–94-3078C
	20:7649	SAND–94-2163
	20:7650	SAND–94-2170C
	20:7823	SAND–94-2709C
	20:7833	SAND–94-2763C
	20:7847	SAND–94-2533
	20:7866	SAND–94-3062C
	20:7880	SAND–94-2257
	20:8039	SAND–93-2122
	20:8040	SAND–94-2568
	20:8106	SAND–94-1810C
	20:8107	SAND–94-3047C
	20:8130	SAND–94-2056C
	20:8131	SAND–94-2617C
	20:8145	SAND–94-1653C
	20:8146	SAND–94-1692C
	20:8147	SAND–94-1703C
	20:8148	SAND–94-2831C
	20:8149	SAND–94-2944C
	20:8175	SAND–94-3147C
	20:8176	SAND–94-8251
	20:8193	SAND–94-1693C
	20:8194	SAND–94-3183C
	20:8222	SAND–95-0108C
	20:8255	SAND–94-1402C
	20:8256	SAND–94-1403C
	20:8257	SAND–94-2064C
	20:8258	SAND–94-3190C
	20:8276	SAND–94-2206C
	20:8277	SAND–94-2531C
	20:8278	SAND–94-2731

Contract No.	Abstract No.	Report No.
	20:8279	SAND–94-2922C
	20:8424	SAND–94-1990C
	20:8425	SAND–94-3252
	20:8980	SAND–94-3070C
	20:9126	SAND–94-1392C
	20:9150	SAND–94-3122C
	20:9195	SAND–95-0067
	Sandia National Labs., Livermore, CA (United States)	
	20:7356	SAND–95-8002
	20:7357	SAND–95-8007
	20:7560	SAND–94-8780
	20:8466	SAND–94-8238
	20:8963	SAND–94-8237
	Nuclear Regulatory Commission, Washington, DC (United States). Div. of Systems Technology	
	20:8509	NUREG/CR–6136
AC05-76OR00001	**Oak Ridge National Lab., TN (United States)**	
	20:7445	ES/ER/TM–123
AC05-76OR00033	**Oak Ridge Associated Universities, Inc., TN (United States)**	
	20:8627	ORAU–94/D-58
	20:8628	ORAU–94/F-10
	20:8629	ORAU–94/F-29
	20:8630	ORAU–94/G-111
	Oak Ridge Inst. for Science and Education, TN (United States)	
	20:8626	ORAU–94/A-24
AC05-84ER40150	**Stanford Linear Accelerator Center, Menlo Park, CA (United States)**	
	20:8306	SLAC-PUB–6527
	Southeastern Universities Research Association, Inc., Newport News, VA (United States). Continuous Electron Beam Accelerator Facility	
	20:8313	DOE/ER/40150–281
AC05-84OR21400	**Argonne National Lab., IL (United States)**	
	20:7761	ANL/TD/CP–85106
	20:8112	ANL/ET/CP–83901
	20:9104	ITER-TN-BL–5-0-3
	Oak Ridge National Lab., TN (United States)	
	20:7282	ORNL/M–3077
	20:7297	DOE/OR–01-1258-D2
	20:7298	DOE/OR–01-1292-D2
	20:7299	DOE/OR–01-1311-D2
	20:7300	DOE/OR–1047-D2
	20:7313	ES/ER/TM–102/R1
	20:7333	ORNL/ER/Sub–87-99053/28
	20:7334	ORNL/TM–12708
	20:7335	ORNL/TM–12823
	20:7336	ORNL/TM–12828
	20:7445	ES/ER/TM–123
	20:7451	ORNL/TM–12474
	20:7471	DOE/OR–01-1290-D1
	20:7473	ES/ER/TM–33/R1
	20:7481	ORNL/ER–169/S3
	20:7482	ORNL/ER–169/S4
	20:7483	ORNL/ER–264
	20:7484	ORNL/ER–286
	20:7485	ORNL/GWPO–012
	20:7533	ORNL–6821
	20:7570	ORNL/TM–12849
	20:7876	ORNL/PPA–94/4
	20:7912	ORNL/TM–12855
	20:8017	ORNL–6828
	20:8075	CONF-941016–5
	20:8076	CONF-941144–53
	20:8143	ORNL/Sub–87-SA946C/04
	20:8218	ORNL/TM–12875
	20:8476	ES/ER/TM–96/R1
	20:8511	ORNL/TM–12886
	20:8544	ORNL/CDIAC–74
	20:8639	ES/ER/TM–76
	20:8640	ES/ER/TM–85/R1
	20:8641	ES/ER/TM–125
	20:8642	ES/ER/TM–126
	20:8644	ORNL–6818
	20:8982	CONF-9410165–10
	20:8992	CONF-940903–1
	20:9149	ORNL/TM–12868
	20:9160	CONF-9410141–6
	20:9181	ORNL/TM–12744
	20:9182	ORNL/TM–12852
	20:9183	ORNL/TM–12853
	20:9194	ORNL/CDIAC–69
	Oak Ridge Y-12 Plant, TN (United States)	
	20:8077	CONF-950110–17
	Martin Marietta Energy Systems, Inc., Oak Ridge, TN (United States)	
	20:7474	ES/ER/TM–113
	General Atomics, San Diego, CA (United States)	
	20:9049	GA-A–21872
AC05-84OT21400	**Oak Ridge K-25 Site, TN (United States)**	
	20:7296	CONF-950304–5
AC05-93OR22160	**IIT Research Inst., Chicago, IL (United States)**	
	20:7301	DOE/OR/22160–T14
	20:7302	DOE/OR/22160–T15
AC06-76RL01830	**Pacific Northwest Lab., Richland, WA (United States)**	
	20:7231	PNL-SA–24557
	20:7251	PNL-SA–25145
	20:7338	PNL–10134
	20:7339	PNL–10173
	20:7340	PNL–10176
	20:7341	PNL–10194
	20:7342	PNL–10283
	20:7343	PNL–10398-Vol.1
	20:7344	PNL–10398-Vol.2
	20:7345	PNL-SA–21497
	20:7346	PNL-SA–23718
	20:7347	PNL-SA–23723
	20:7348	PNL-SA–23952
	20:7349	PNL-SA–24027
	20:7350	PNL-SA–24672
	20:7351	PNL-SA–24698
	20:7352	PNL-SA–24741
	20:7353	PNL-SA–25050
	20:7444	DOE/RL–91-50-Rev.1
	20:7452	PNL-SA–23775
	20:7453	PNL-SA–24176
	20:7486	PNL–10184
	20:7487	PNL-SA–23839
	20:7571	PNL-SA–24417
	20:7600	PNL–10222
	20:7752	PNL-SA–19604
	20:7760	PNL–10286
	20:7864	PNL–10415
	20:7877	PNL–9410-4
	20:7878	PNL–10258
	20:8007	PNL–10121
	20:8008	PNL–10387
	20:8018	DOE/BP–1958
	20:8037	PNL–10365
	20:8038	PNL-SA–24367
	20:8055	PNL-SA–24553
	20:8105	PNL-SA–21635
	20:8144	PNL-SA–25425
	20:8191	PNL-SA–24552

Contract No.	Abstract No.	Report No.
	20:8192	PNL-SA–25345
	20:8244	PNL-SA–24072
	20:8395	PNL-SA–22048
	20:8396	PNL-SA–24009
	20:8397	PNL-SA–24010
	20:8398	PNL-SA–24144
	20:8409	PNL-SA–24344
	20:8464	PNL-SA–24394
	20:8512	PNL–10195
	20:8546	PNL-SA–24935
	20:8593	PNL-SA–25339
	20:8631	PNL-SA–21776
	20:8632	PNL-SA–24024
	20:8633	PNL-SA–25192
	20:8870	PNL-SA–21810
	20:9124	PNL-SA–24129
	20:9184	PNL–10382
	20:9185	PNL-SA–23824
	20:9186	PNL-SA–25031
AC06-83ER40128	**Spectra Technology, Inc., Bellevue, WA (United States)**	
	20:8285	DOE/ER/40128–T8
	20:8286	DOE/ER/40128–T9
	STI Optronics, Bellevue, WA (United States)	
	20:8287	DOE/ER/40128–T10
AC06-87RL10930	**Westinghouse Hanford Co., Richland, WA (United States)**	
	20:7283	WHC-SD-FF-DRR–00018
	20:7284	WHC-SD-SNF-EDL–001
	20:7287	WHC-SD-GN-CSCM–30022
	20:7367	WHC-EP–0809
	20:7368	WHC-EP–0829
	20:7369	WHC-EP–0832
	20:7370	WHC-EP–0839
	20:7371	WHC-SA–2407
	20:7372	WHC-SA–2505
	20:7373	WHC-SD-L225-ATP–001
	20:7374	WHC-SD-LEF-TS–001
	20:7375	WHC-SD-NR-CSER–014-Rev.1
	20:7376	WHC-SD-SNF-CSER–002
	20:7377	WHC-SD-SNF-SARR–003
	20:7378	WHC-SD-SNF-SARR–004
	20:7379	WHC-SD-TD-CR–001
	20:7380	WHC-SD-TD-ICD–001
	20:7381	WHC-SD-W007H-ATR–001
	20:7382	WHC-SD-W025-VI–001
	20:7383	WHC-SD-W049H-ICD–001-Rev.1
	20:7384	WHC-SD-W100-AP–002
	20:7385	WHC-SD-W151-ANAL–001
	20:7386	WHC-SD-W236A-ER–008
	20:7387	WHC-SD-W314B-DA–002
	20:7388	WHC-SD-W320-QAPP–001-Rev.1
	20:7389	WHC-SD-W340-ES–002
	20:7390	WHC-SD-W378-SP–001
	20:7391	WHC-SD-WM-ANAL–040
	20:7392	WHC-SD-WM-ATP–093
	20:7393	WHC-SD-WM-ATP–113
	20:7394	WHC-SD-WM-ATR–082
	20:7395	WHC-SD-WM-DA–144
	20:7396	WHC-SD-WM-DA–159
	20:7397	WHC-SD-WM-DP–073
	20:7398	WHC-SD-WM-DP–075
	20:7399	WHC-SD-WM-ER–332
	20:7400	WHC-SD-WM-ER–349
	20:7401	WHC-SD-WM-ER–352
	20:7402	WHC-SD-WM-ES–316
	20:7403	WHC-SD-WM-FDC–032
	20:7404	WHC-SD-WM-OTP–167
	20:7405	WHC-SD-WM-OTP–168
	20:7406	WHC-SD-WM-OTP–171
	20:7407	WHC-SD-WM-SARR–012-Rev.1
	20:7408	WHC-SD-WM-SDR–008
	20:7409	WHC-SD-WM-SOIL–001
	20:7410	WHC-SD-WM-TA–154
	20:7411	WHC-SD-WM-TA–156
	20:7412	WHC-SD-WM-TI–386
	20:7413	WHC-SD-WM-TI–608-Rev.1
	20:7414	WHC-SD-WM-TI–666
	20:7415	WHC-SD-WM-TP–163
	20:7416	WHC-SD-WM-TP–180
	20:7417	WHC-SD-WM-TP–206
	20:7418	WHC-SD-WM-TP–219-Rev.1
	20:7419	WHC-SD-WM-TP–293
	20:7420	WHC-SD-WM-TP–298
	20:7421	WHC-SD-WM-TRP–229
	20:7422	WHC-SD-WM-VI–014
	20:7423	WHC-SD-WM-WP–218-Rev.1
	20:7424	WHC-SP–1108
	20:7455	WHC-EP–0813
	20:7456	WHC-SD-EN-TI–241
	20:7457	WHC-SD-W337-ATP–001
	20:7458	WHC-SD-W337-OTP–001
	20:7459	WHC-SD-WM-TI–680
	20:7489	WHC-EP–0532-Rev.2
	20:7490	WHC-EP–0797
	20:7491	WHC-SA–2731
	20:7492	WHC-SD-CP-RPT–012-Rev.1
	20:7493	WHC-SD-EN-PRS–002
	20:7494	WHC-SD-GN-TRP–20026
	20:7495	WHC-SD-PRP-HA–014
	20:7496	WHC-SD-SNF-TA–002
	20:7497	WHC-SD-SNF-TA–003
	20:7498	WHC-SD-T100-PMP–001
	20:7499	WHC-SD-WM-ANAL–039
	20:7500	WHC-SD-WM-DP–080
	20:7501	WHC-SD-WM-ER–391
	20:7502	WHC-SD-WM-FHA–006
	20:7512	WHC-SD-339-SDR–002-Rev.1
	20:7666	WHC-SD-SNF-PTR–001
	20:8178	WHC-SD-TD-RPT–010
	20:8245	WHC-SD-SQA-CSA–20381
	20:8246	WHC-SD-SQA-CSA–20384
	20:8247	WHC-SD-WM-OTP–170
	20:8248	WHC-SD-WM-OTR–170
	20:8410	WHC-SD-EN-TI–292
	20:8518	WHC-EP–0446-2
	20:8636	WHC-SD-SNF-AP–001
	20:9151	WHC-SD-TD-CSWD–002
	20:9152	WHC-SP–1118
	20:9196	WHC-SA–1769
	Pacific Northwest Lab., Richland, WA (United States)	
	20:8409	PNL-SA–24344
AC06-93RL12367	**Bechtel Hanford, Inc., Richland, WA (United States)**	
	20:7472	DOE/RL–94-46
AC07-76ID01570	**Department of Energy, Idaho Falls, ID (United States). Idaho Operations Office**	
	20:8434	DOE/ID–10437(93)
	EG and G Idaho, Inc., Idaho Falls, ID (United States)	
	20:7311	EGG-WM–11049

Contract No.	Abstract No.	Report No.
	20:7312	EGG-WM–11467
	20:7608	EGG-M–94185
	20:8129	PATENTS-US–A7988598
	20:9189	EGG-WTD–11252-Vol.1
AC07-81NE44139	**West Valley Nuclear Services Co., Inc., West Valley, NY (United States)**	
	20:7337	PATENTS-US–A7967463
AC08-85NV10384	**Nevada Univ., Reno, NV (United States). Desert Research Inst.**	
	20:8471	DOE/NV/10384–28
AC08-88NV10617	**EG and G Energy Measurements, Inc., Pleasanton, CA (United States)**	
	20:8243	PATENTS-US–A7984598
AC08-90NV10845	**Nevada Univ., Reno, NV (United States). Desert Research Inst.**	
	20:8471	DOE/NV/10384–28
	USDOE Economic Regulatory Administration, Washington, DC (United States). Office of Utility Systems	
	20:7443	DOE/NV/10845–T20
	20:8650	DOE/NV/10845–49
	Nevada Univ., Reno, NV (United States). Water Resources Center	
	20:8473	DOE/NV/10845–50
	Nevada Univ., Las Vegas, NV (United States). Water Resources Center	
	20:8435	DOE/NV/10845–42
	20:8472	DOE/NV/10845–35
AC08-93NV11265	**Lawrence Livermore National Lab., CA (United States)**	
	20:8645	UCRL-JC–118082
AC09-76SR00001	**Du Pont de Nemours (E.I.) and Co., Wilmington, DE (United States). Explosives Dept.**	
	20:7308	DPW–55-4-9
	20:7309	DPW–55-4-10
	20:7310	DPW–55-4-40
	20:7705	DPW–55-17-23
	20:7767	DPW–55-16-39
AC09-89SR18035	**Westinghouse Savannah River Co., Aiken, SC (United States)**	
	20:7260	WSRC-TR–94-100-6
	20:7261	WSRC-TR–94-100-8
	20:7285	WSRC-TR–94-0366
	20:7286	WSRC-TR–94-0438
	20:7315	HLW-TEC–940020
	20:7425	WSRC-MS–94-0203P
	20:7427	WSRC-MS–94-0600
	20:7428	WSRC-MS–94-0608
	20:7429	WSRC-MS–95-0012
	20:7430	WSRC-MS–95-0013
	20:7431	WSRC-MS–95-0025
	20:7432	WSRC-MS–95-0028
	20:7433	WSRC-RP–94-1272
	20:7434	WSRC-TR–94-0221
	20:7435	WSRC-TR–94-0311
	20:7436	WSRC-TR–94-0326
	20:7437	WSRC-TR–94-0437
	20:7438	WSRC-TR–94-0462
	20:7439	WSRC-TR–94-0509
	20:7440	WSRC-TR–95-0014
	20:7460	WSRC-RP–94-522
	20:7461	WSRC-RP–94-584
	20:7462	WSRC-RP–94-585
	20:7463	WSRC-TR–94-0494
	20:7464	WSRC-TR–94-0539
	20:7503	WSRC-MS–94-0418
	20:7504	WSRC-RP–94-01140
	20:7505	WSRC-TR–93-301-Rev.3
	20:7506	WSRC-TR–94-0224-Rev.1
	20:7507	WSRC-TR–94-0350
	20:7508	WSRC-TR–94-0524
	20:7697	WSRC-MS–94-0632
	20:7822	PATENTS-US–A7967482
	20:8172	PATENTS-US–A7999338
	20:8227	EPD-CTG–94-0037
	20:8274	PATENTS-US–A7993553
	20:8412	PATENTS-US–A7979672
	20:8519	WSRC-TR–94-0345
	20:8520	WSRC-TR–94-0490
	20:8521	WSRC-TR–94-0493
	20:8522	WSRC-TR–94-0495
	20:8637	WSRC-TR–94-054
	Bechtel Savannah River, Inc., Aiken, SC (United States)	
	20:7426	WSRC-MS–94-0453
AC11-76PN00014	**Westinghouse Electric Corp., West Mifflin, PA (United States)**	
	20:8242	PATENTS-US–A7970883
AC21-86MC22118	**Radian Corp., Austin, TX (United States)**	
	20:7151	DOE/MC/22118–3865
AC21-89MC26006	**Department of Energy, Morgantown, WV (United States). Morgantown Energy Technology Center**	
	20:7917	DOE/MC/26006–3960
	Allied-Signal Aerospace Co., Torrance, CA (United States)	
	20:7916	DOE/MC/26006–3824
AC21-89MC26288	**Manufacturing and Technology Conversion International, Inc., Santa Fe Springs, CA (United States)**	
	20:7152	DOE/MC/26288–3961
AC21-89MC26366	**Louisiana State Univ., Baton Rouge, LA (United States). Dept. of Chemical Engineering**	
	20:7102	DOE/MC/26366–3962
AC21-90MC27168	**USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States)**	
	20:7943	DOE/METC–94/1010
AC21-90MC27394	**USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States)**	
	20:7935	DOE/METC–94/1010
	20:7939	DOE/METC–94/1010
	20:7945	DOE/METC–94/1010
AC21-91MC28162	**Kentucky Univ., Lexington, KY (United States). Center for Applied Energy Research**	
	20:7633	DOE/MC/28162–3951
AC21-92MC29109	**Department of Energy, Morgantown, WV (United States). Morgantown Energy Technology Center**	
	20:8154	DOE/MC/29109–3979
	Engineering Computer Opteconomics, Inc., Annapolis, MD (United States)	
	20:8344	DOE/MC/29109–3977
	20:8345	DOE/MC/29109–3978
AC21-92MC29119	**UTD, Inc., Newington, VA (United States)**	
	20:8416	DOE/MC/29119–3881
AC21-92MC29246	**Minnesota Univ., Minneapolis, MN (United States)**	
	20:7104	DOE/MC/29246–3941
	20:7105	DOE/MC/29246–3944
AC21-93MC30054	**USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States)**	
	20:7926	DOE/METC–94/1010
AC21-94MC30012	**Louisiana State Univ., Baton Rouge, LA (United States)**	
	20:7107	DOE/MC/30012–3980
AC22-87PC79819	**Hydrocarbon Research, Inc., Princeton, NJ (United States)**	
	20:7110	DOE/PC/79819–12
AC22-89BC14477	**Pennsylvania State Univ., University Park, PA (United States)**	
	20:7189	DOE/BC/14477–16

Contract No.	Abstract No.	Report No.
	20:7190	DOE/BC/14477–17
AC22-89PC89805	Little (Arthur D.), Inc., Cambridge, MA (United States)	
	20:7171	DOE/PC/89805–T9
AC22-89PC89903	Lehigh Univ., Bethlehem, PA (United States). Center for Molecular Bioscience and Biotechnology	
	20:7112	DOE/PC/89903–T16
	20:7113	DOE/PC/89903–T17
	Lehigh Univ., Bethlehem, PA (United States). Dept. of Molecular Biology	
	20:7114	DOE/PC/89903–T18
AC22-90BC14654	K and A Energy Consultants, Inc., Tulsa, OK (United States)	
	20:7196	DOE/BC/14654–T6
	20:7197	DOE/BC/14654–T8
	20:7198	DOE/BC/14654–T9
AC22-90BC14662	Oklahoma Univ., Norman, OK (United States)	
	20:7199	DOE/BC/14662–15
AC22-90BC14664	Michigan Univ., Ann Arbor, MI (United States)	
	20:7200	DOE/BC/14664–12
AC22-90PC90044	Lehigh Univ., Bethlehem, PA (United States)	
	20:7564	DOE/PC/90044–10
AC22-91PC90042	UOP, Inc., Des Plaines, IL (United States)	
	20:7563	DOE/PC/90042–T10
AC22-91PC90046	Union Carbide Corp., South Charleston, WV (United States)	
	20:7566	DOE/PC/90046–T11
	Union Carbide Chemicals and Plastics Co., Inc., South Charleston, WV (United States)	
	20:7565	DOE/PC/90046–T10
AC22-91PC90057	Amoco Oil Co., Naperville, IL (United States). Research and Development Dept.	
	20:7229	DOE/PC/90057–T10
	20:7230	DOE/PC/90057–T11
AC22-91PC90365	Southern Research Inst., Birmingham, AL (United States)	
	20:7156	DOE/PC/90365–T16
AC22-91PC91027	Brown Univ., Providence, RI (United States). Div. of Engineering	
	20:7115	DOE/PC/91027–1
	20:7116	DOE/PC/91027–2
	20:7117	DOE/PC/91027–3
	20:7118	DOE/PC/91027–4
	20:7119	DOE/PC/91027–5
	20:7120	DOE/PC/91027–6
	20:7121	DOE/PC/91027–7
	20:7122	DOE/PC/91027–8
AC22-91PC91039	SRI International, Menlo Park, CA (United States)	
	20:7124	DOE/PC/91039–T11
AC22-91PC91054	Pittsburgh Univ., PA (United States). Dept. of Chemical and Petroleum Engineering	
	20:7128	DOE/PC/91054–T12
AC22-91PC91055	Auburn Univ., AL (United States). Dept. of Chemical Engineering	
	20:7129	DOE/PC/91055–T9
AC22-91PC91056	Chicago Univ., IL (United States). Dept. of Chemistry	
	20:7130	DOE/PC/91056–T7
AC22-91PC91161	Vortec Corp., Collegeville, PA (United States)	
	20:7172	DOE/PC/91161–T9
AC22-92BC14831	Louisiana State Univ., Baton Rouge, LA (United States). Dept. of Petroleum Engineering	
	20:7201	DOE/BC/14831–12
AC22-92BC14881	Kansas Univ. Center for Research, Inc., Lawrence, KS (United States)	
	20:7207	DOE/BC/14881–9
AC22-92BC14882	University of Southern Mississippi, Hattiesburg, MS (United States). Dept. of Polymer Science	
	20:8180	DOE/BC/14882–9
AC22-92BC14883	Illinois Inst. of Tech., Chicago, IL (United States)	
	20:7208	DOE/BC/14883–8
	20:7209	DOE/BC/14883–9
AC22-92BC14884	Columbia Univ., New York, NY (United States)	
	20:7210	DOE/BC/14884–9
	20:7211	DOE/BC/14884–10
AC22-92MT92008	Pennsylvania State Univ., University Park, PA (United States)	
	20:7239	DOE/MT/92008–9
AC22-92MT92009	Resource Technology Corp., Laramie, WY (United States)	
	20:7240	DOE/MT/92009–9
AC22-92PC91050	Canadian Energy Development, Inc., Edmonton, AB (Canada)	
	20:7125	DOE/PC/91050–T8-Vol.1
	20:7126	DOE/PC/91050–T8-Vol.4
	20:7127	DOE/PC/91050–T9
AC22-92PC91338	Radian Corp., Austin, TX (United States)	
	20:7634	DOE/PC/91338–T8
AC22-92PC91344	SRI International, Menlo Park, CA (United States)	
	20:7635	DOE/PC/91344–T10
AC22-92PC92111	Massachusetts Inst. of Tech., Cambridge, MA (United States). Energy Lab.	
	20:7248	DOE/PC/92111–T7
AC22-92PC92159	ABB/Combustion Engineering, Inc., Windsor, CT (United States)	
	20:7174	DOE/PC/92159–T9
AC22-92PC92246	Virginia Center for Coal and Minerals Processing, Blacksburg, VA (United States)	
	20:7097	DOE/PC/92246–T7
	20:7135	DOE/PC/92246–T6
AC22-93BC14860	Surtek, Inc., Golden, CO (United States)	
	20:7203	DOE/BC/14860–8
AC22-93BC14861	Maurer Engineering, Inc., Houston, TX (United States)	
	20:7204	DOE/BC/14861–5
AC22-93BC14891	Colorado School of Mines, Golden, CO (United States)	
	20:7212	DOE/BC/14891–4
AC22-93BC14893	New Mexico Inst. of Mining and Technology, Socorro, NM (United States)	
	20:7191	DOE/BC/14893–4
AC22-93BC14896	USDOE Bartlesville Project Office, OK (United States)	
	20:7192	DOE/BC/14896–4
AC22-93PC91029	Bechtel Corp., San Francisco, CA (United States)	
	20:7123	DOE/PC/91029–T3
AC22-93PC92147	Hydrocarbon Research, Inc., Princeton, NJ (United States)	
	20:7134	DOE/PC/92147–7
AC22-93PC92190	Physical Sciences, Inc., Andover, MA (United States)	
	20:7175	DOE/PC/92190–T6
AC22-93PC92206	AMAX R and D, Inc., Pittsburgh, PA (United States)	
	20:7096	DOE/PC/92206–T7

Contract No.	Abstract No.	Report No.
AC22-93PC92251	Utah Univ., Salt Lake City, UT (United States)	
	20:7146	DOE/PC/92251–T7
AC22-94PC91008	BDM Oklahoma, Inc., Bartlesville, OK (United States)	
	20:7227	NIPER/BDM–0086
AC22-94PC93054	CONSOL, Inc., Library, PA (United States)	
	20:7138	DOE/PC/93054–4
AC24-92OR21972	Fernald Environmental Restoration Management Corp., Cincinnati, OH (United States). Fernald Environmental Management Project	
	20:9132	FEMP–2394
	Fernald Environmental Restoration Management Corp., Cincinnati, OH (United States)	
	20:7475	FEMP–2396
AC35-89ER40486	Brookhaven National Lab., Upton, NY (United States)	
	20:8415	BNL–61272
AC36-83CH10093	USDOE Assistant Secretary for Conservation and Renewable Energy, Washington, DC (United States). Geothermal Div.	
	20:7607	DOE/GO–10094-005
	National Renewable Energy Lab., Golden, CO (United States)	
	20:7543	DOE/GO–10094-037
	20:7544	DOE/GO–10094-039
	20:7552	NREL/TP–421-7577
	20:7583	NREL/TP–411-7472
	20:7584	NREL/TP–411-7473
	20:7585	NREL/TP–433-7209
	20:7586	NREL/TP–472-7023
	20:7598	NREL/TP–411-7402
	20:7599	NREL/TP–471-7296
	20:7620	NREL/TP–440-7224
	20:7621	NREL/TP–441-7077
	20:7622	NREL/TP–442-7111
	20:7863	NREL/TP–461-6684
	20:7875	NREL/SP–336-7233
	20:8044	DOE/CH/10093–273
	20:8049	NREL/TP–463-7230
	20:8062	NREL/TP–473-7026
	20:8064	NREL/TP–425-6722
	20:8413	PATENTS-US–A7967481
	20:8462	NREL/TP–433-6943
	20:8463	NREL/TP–471-7262
AI01-86ER13520	National Inst. of Standards and Technology (NML), Gaithersburg, MD (United States). Electron and Optical Physics Div.	
	20:8959	DOE/ER/13520–T1
	20:8960	DOE/ER/13520–T2
AI08-92NV10874	Geological Survey, Denver, CO (United States)	
	20:7366	USGS-OFR–92-657
	20:7454	USGS/OFR–94-303
AI79-88BP91964	Fish and Wildlife Service, Portland, OR (United States). Columbia River Field Station	
	20:7577	DOE/BP/91964–3
AM79-91BP13330	Ecotope, Inc., Seattle, WA (United States)	
	20:7960	DOE/BP–2458
AM79-92BP25105	Mobrand Biometrics, Inc., Vashon Island, WA (United States)	
	20:8523	DOE/BP/25105–1
BI79-85BP22493	Idaho Dept. of Fish and Game, Boise, ID (United States). Fisheries Research Section	
	20:7575	DOE/BP/22493–8
BI79-87BP66088	Idaho Univ., Moscow, ID (United States). Coll. of Forestry, Wildlife and Range Sciences	
	20:7539	DOE/BP/66088–1
BI79-89BP01385	Oregon Dept. of Fish and Wildlife, Portland, OR (United States)	
	20:7573	DOE/BP/01385–2
BI79-91BP23720	Oregon Dept. of Fish and Wildlife, Portland, OR (United States)	
	20:7576	DOE/BP/23720–21
FC02-90ID13001	Nuclear Consulting Services, Inc., Columbus, OH (United States)	
	20:8024	DOE/ID/13001–1
FC07-88ID12772	Rensselaer Polytechnic Inst., Troy, NY (United States)	
	20:8022	DOE/ID/12772–3
FC07-88ID12833	Praxair, Inc., Tarrytown, NY (United States)	
	20:8023	DOE/ID/12833–1
FC21-91MC27205	Department of Energy, Morgantown, WV (United States). Morgantown Energy Technology Center	
	20:8045	DOE/MC/27205–3963
	Doniee Technologies, Inc., York, PA (United States)	
	20:7168	DOE/MC/27205–3964
FC21-91MC27362	Bethlehem Steel Corp., PA (United States)	
	20:7169	DOE/MC/27362–3860
FC21-91MC27363	Tampa Electric Co., FL (United States)	
	20:7629	DOE/MC/27363–3870
FC21-91MC28055	USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States)	
	20:7918	DOE/METC–94/1010
	20:7919	DOE/METC–94/1010
FC21-92MC27391	Kerr-McGee Coal Corp., Oklahoma City, OK (United States)	
	20:7103	DOE/MC/27391–3943
FC21-92MC28245	Atomic Energy of Canada Ltd., Chalk River, ON (Canada)	
	20:8470	DOE/MC/28245–3922
FC21-92MC29237	USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States)	
	20:7941	DOE/METC–94/1010
FC21-93MC29444	TAMCO Power Partners, Williamsport, PA (United States)	
	20:7106	DOE/MC/29444–3984
FC21-93MC30252	Southern Illinois Univ., Carbondale, IL (United States). Dept. of Mining Engineering	
	20:7153	DOE/MC/30252–3945
FC22-90PC89663	CQ, Inc., Homer City, PA (United States)	
	20:7630	DOE/PC/89663–T14
FC22-91PC90548	LIFAC North America, Inc., Oakland, CA (United States)	
	20:7157	DOE/PC/90548–T14
	20:7158	DOE/PC/90548–T15
FC22-92PC92521	Illinois Dept. of Energy and Natural Resources, Springfield, IL (United States)	
	20:7098	DOE/PC/92521–T193
FC22-93BC14951	Tulsa Univ., OK (United States)	
	20:7213	DOE/BC/14951–8
FC22-93BC14952	Anderman/Smith Operating Co., Denver, CO (United States)	
	20:7214	DOE/BC/14952–10
FC22-93BC14954	Diversified Operating Corp., New Raymer, CO (United States)	
	20:7215	DOE/BC/14954–8
FC22-93BC14958	Lomax Exploration Co., Salt Lake City, UT (United States)	
	20:7216	DOE/BC/14958–T2

Contract No.	Abstract No.	Report No.
FC22-93BC14960	Texaco Exploration and Production, Inc., New Orleans, LA (United States)	
	20:7217	DOE/BC/14960–6
FC22-93BC14963	Amoco Production Co., Houston, TX (United States)	
	20:7218	DOE/BC/14963–4
	20:7219	DOE/BC/14963–6
FC22-94BC14983	Michigan Technological Univ., Houghton, MI (United States)	
	20:7222	DOE/BC/14983–2
FC22-94BC14984	Luff Exploration Co., Denver, CO (United States)	
	20:7223	DOE/BC/14984–1
FC22-94BC14986	Texaco Exploration and Production, Inc., Midland, TX (United States)	
	20:7224	DOE/BC/14986–2
FC22-94BC14990	Oxy USA, Inc., Welch, TX (United States)	
	20:7225	DOE/BC/14990–1
FC22-94PC94116	Acurex Corp., Research Triangle Park, NC (United States)	
	20:7100	DOE/PC/94116–T1
	Acurex Environmental Corp., Research Triangle Park, NC (United States)	
	20:7101	DOE/PC/94116–T2
FC36-89ID12779	Air Products and Chemicals, Inc., Allentown, PA (United States)	
	20:8139	DOE/ID/12779–3
FC79-82BP34625	Idaho Dept. of Water Resources, Boise, ID (United States)	
	20:8019	DOE/BP–2457
FG01-88IE10688	Atlantic Council of the United States, Washington, DC (United States)	
	20:7888	CONF-8810273–
FG01-89CE26592	Drexel Univ., Philadelphia, PA (United States)	
	20:8249	DOE/CE/26592–2
FG01-90CE21009	ACEC Research and Management Foundation, Washington, DC (United States)	
	20:7961	DOE/CE/21009–T1
FG01-90CE90043	American Chemical Society, Washington, DC (United States)	
	20:7845	DOE/CE/90043–T1
FG01-90IE10859	East-West Center, Honolulu, HI (United States)	
	20:7237	DOE/IE/10859–T4
FG01-91CE26610	Guillot-Vogt Associates, Inc., Metairie, LA (United States)	
	20:8043	DOE/CE/26610–T1
FG01-92CE15544	South Dakota State Univ., Brookings, SD (United States)	
	20:8598	DOE/CE/15544–T9
FG01-92EW50625	Medical Univ. of South Carolina, Charleston, SC (United States)	
	20:7853	DOE/EW/50625–T21
FG01-93CE15558	Gilfillan Engineering and Environmental Testing, Inc., Anchorage, AK (United States)	
	20:8042	DOE/CE/15558–T3
FG01-93FE62803	Texaco Development Corp., White Plains, NY (United States)	
	20:7628	DOE/FE/62803–T1
FG01-94CE15613	Burton Technologies, Inc., Raleigh, NC (United States)	
	20:8137	DOE/CE/15613–T3
FG02-85ER45201	Rochester Univ., NY (United States). Dept. of Mechanical Engineering	
	20:8069	DOE/ER/45201–T2
FG02-85ER53198	Wisconsin Univ., Madison, WI (United States). Plasma Physics Research	
	20:9044	DOE/ER/53198–253
	20:9045	DOE/ER/53198–254
FG02-85ER53212	Wisconsin Univ., Madison, WI (United States). Dept. of Physics	
	20:9046	DOE/ER/53212–255
FG02-86ER40246	Massachusetts Univ., Lowell, MA (United States)	
	20:8906	DOE/ER/40246–9
FG02-86ER40281	Brookhaven National Lab., Upton, NY (United States)	
	20:8880	BNL–61074
FG02-86ER40291	State Univ. of New York, Binghamton, NY (United States). Dept. of Physics	
	20:8714	DOE/ER/40291–22
	20:8715	DOE/ER/40291–23
	20:8716	DOE/ER/40291–24
	20:8717	DOE/ER/40291–25
	20:8783	DOE/ER/40291–26
FG02-86ER45237	State Univ. of New York, Stony Brook, NY (United States). Research Foundation	
	20:8138	DOE/ER/45237–T3
FG02-87ER13676	Massachusetts Univ., Amherst, MA (United States). Dept. of Chemical Engineering	
	20:8020	DOE/ER/13676–7
FG02-88ER25052	New York Univ., NY (United States). Courant Inst. of Mathematical Sciences	
	20:9161	DOE/ER/25052–4
FG02-88ER60617	Case Western Reserve Univ., Cleveland, OH (United States)	
	20:8198	DOE/ER/60617–6
	20:8199	DOE/ER/60617–7
	20:8200	DOE/ER/60617–8
FG02-88ER60656	New York Univ. Medical Center, NY (United States). Dept. of Cell Biology	
	20:8612	DOE/ER/60656–7
FG02-89ER53297	Princeton Univ., NJ (United States). Plasma Physics Lab.	
	20:9079	PPPL–3029
FG02-90ER45427	Purdue Univ., Lafayette, IN (United States)	
	20:8120	DOE/ER/45427–5
	Uniwersytet Jagiellonski, Cracow (Poland). Dept. of Physics	
	20:9029	CONF-931077–1
FG02-90ER80910	USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States)	
	20:7933	DOE/METC–94/1010
FG02-91CE23810	Air-Conditioning and Refrigeration Technology Inst., Inc., Arlington, VA (United States)	
	20:7962	DOE/CE/23810–48C
	20:8432	DOE/CE/23810–48
FG02-91ER14227	Arizona State Univ., Tempe, AZ (United States). Dept. of Chemistry and Biochemistry	
	20:8181	DOE/ER/14227–3
FG02-91ER40628	Brookhaven National Lab., Upton, NY (United States)	
	20:8711	BNL–61139
FG02-91ER40672	Stanford Linear Accelerator Center, Menlo Park, CA (United States)	
	20:8770	SLAC-PUB–6700
	20:8805	SLAC-PUB–6550
	Stanford Univ., CA (United States)	
	20:8804	SLAC-PUB–6549
FG02-91ER40676	Stanford Linear Accelerator Center, Menlo Park, CA (United States)	
	20:8770	SLAC-PUB–6700
	20:8805	SLAC-PUB–6550
	Stanford Univ., CA (United States)	
	20:8804	SLAC-PUB–6549

Contract No.	Abstract No.	Report No.
FG02-91ER40677	Stanford Linear Accelerator Center, Menlo Park, CA (United States)	
	20:8770	SLAC-PUB-6700
	20:8805	SLAC-PUB-6550
	Stanford Univ., CA (United States)	
	20:8804	SLAC-PUB-6549
FG02-91ER54109	Princeton Univ., NJ (United States). Plasma Physics Lab.	
	20:9081	PPPL-3033
	General Atomics, San Diego, CA (United States)	
	20:9049	GA-A-21872
FG02-91ER75642	SciTech, Inc., Aurora, IL (United States)	
	20:8654	DOE/ER/75642-T2
FG02-91ER75671	South Dakota State Univ., Brookings, SD (United States). Dept. of Chemistry	
	20:8221	DOE/ER/75671-T1
FG02-91ER81186	USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States)	
	20:7932	DOE/METC-94/1010
FG02-92ER40715	Stanford Linear Accelerator Center, Menlo Park, CA (United States)	
	20:8770	SLAC-PUB-6700
FG02-92ER61364	State Univ. of New York, Albany, NY (United States). Atmospheric Sciences Research Center	
	20:8433	DOE/ER/61364-3
FG02-92ER61400	Massachusetts Inst. of Tech., Cambridge, MA (United States)	
	20:8582	DOE/ER/61400-T1
FG02-92ER75747	Oregon State Univ., Corvallis, OR (United States)	
	20:7765	CONF-9404227-1
FG02-93ER20123	Ohio State Univ. Research Foundation, Columbus, OH (United States)	
	20:8597	CONF-9308258-Absts.
FG02-93ER61576	Brigham and Women's Hospital, Boston, MA (United States)	
	20:8573	CONF-9304276-Summ.
FG02-93ER79214	Worcester Polytechnic Inst., MA (United States)	
	20:7766	DOE/ER/79214-1
FG02-94ER25199	Cornell Univ., Ithaca, NY (United States). Dept. of Computer Science	
	20:9162	DOE/ER/25199-T1
FG03-86ER40271	Brookhaven National Lab., Upton, NY (United States)	
	20:8880	BNL-61074
FG03-86ER53225	General Atomics, San Diego, CA (United States)	
	20:9049	GA-A-21872
FG03-86ER60490	San Diego State Univ., CA (United States)	
	20:8569	DOE/ER/60490-T5
	20:8570	DOE/ER/60490-T6
FG03-89ER14081	Stanford Univ., CA (United States). Dept. of Geological and Environmental Sciences	
	20:8649	DOE/ER/14081-T3
FG03-89ER51121	General Atomics, San Diego, CA (United States)	
	20:9049	GA-A-21872
FG03-90ER61032	California Univ., Berkeley, CA (United States)	
	20:8586	DOE/ER/61032-T2
FG03-91ER40618	Stanford Linear Accelerator Center, Menlo Park, CA (United States)	
	20:8805	SLAC-PUB-6550
	Stanford Univ., CA (United States)	
	20:8804	SLAC-PUB-6549
FG03-91ER40662	Stanford Linear Accelerator Center, Menlo Park, CA (United States)	
	20:8769	SLAC-PUB-6658
FG03-91ER61137	City of Hope Beckman Research Inst., Duarte, CA (United States)	
	20:8581	DOE/ER/61137-T3
FG03-91ER81228	USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States)	
	20:7934	DOE/METC-94/1010
FG03-91ER81229	USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States)	
	20:7934	DOE/METC-94/1010
FG03-92ER40689	Stanford Linear Accelerator Center, Menlo Park, CA (United States)	
	20:8805	SLAC-PUB-6550
	Stanford Univ., CA (United States)	
	20:8804	SLAC-PUB-6549
FG03-92ER40701	Stanford Linear Accelerator Center, Menlo Park, CA (United States)	
	20:8770	SLAC-PUB-6700
	20:8805	SLAC-PUB-6550
	Stanford Univ., CA (United States)	
	20:8804	SLAC-PUB-6549
FG03-92ER54150	Princeton Univ., NJ (United States). Plasma Physics Lab.	
	20:9081	PPPL-3033
FG03-92ER81419	USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States)	
	20:7934	DOE/METC-94/1010
FG03-93ER40788	Stanford Linear Accelerator Center, Menlo Park, CA (United States)	
	20:8770	SLAC-PUB-6700
	20:8805	SLAC-PUB-6550
	Stanford Univ., CA (United States)	
	20:8804	SLAC-PUB-6549
FG03-93ER54224	Princeton Univ., NJ (United States). Plasma Physics Lab.	
	20:9085	PPPL-3040
FG03-93ER61670	Eleanor Roosevelt Inst., Denver, CO (United States)	
	20:8583	DOE/ER/61670-1
FG03-93ER61725	Houston Advanced Research Center, The Woodlands, TX (United States)	
	20:8577	CONF-9310397-Summ.
FG03-94ER54271	Princeton Univ., NJ (United States). Plasma Physics Lab.	
	20:9081	PPPL-3033
FG05-80ET53088	Texas Univ., Austin, TX (United States). Inst. for Fusion Studies	
	20:8973	DOE/ET/53088-670
	20:8974	DOE/ET/53088-685
FG05-85ER60355	Miami Univ., Coral Gables, FL (United States)	
	20:8524	DOE/ER/60355-T3
FG05-89ER60743	National Academy of Sciences - National Research Council, Washington, DC (United States)	
	20:8526	DOE/ER/60743-T2
	20:8527	DOE/ER/60743-T3
	National Research Council, Washington, DC (United States). Water Science and Technology Board	
	20:8525	DOE/ER/60743-T1
FG05-90ER60934	National Academy of Sciences, Washington, DC (United States). Ocean Studies Board	
	20:8528	DOE/ER/60934-T1
	20:8529	DOE/ER/60934-T2
FG05-91OR21981	Tennessee Dept. of Environment and Conservation, Oak Ridge, TN (United States). DOE Oversight Div.	
	20:7854	DOE/OR/21981-T4
	20:7855	DOE/OR/21981-T5
FG05-92ER40736	Texas Univ., Dallas, TX (United States)	
	20:8784	DOE/ER/40736-T1

Contract No.	Abstract No.	Report No.
FG05-94ER40878	Oregon Univ., Eugene, OR (United States). Dept. of Physics	
	20:8250	DOE/ER/40878–T1
FG05-94ER40879	Prairie View A and M Univ., TX (United States)	
	20:9163	DOE/ER/40879–T1
FG05-94ER40880	Colorado State Univ., Fort Collins, CO (United States). Dept. of Physics	
	20:8754	DOE/ER/40880–1
FG05-94ER40888	Texas Univ., Arlington, TX (United States)	
	20:8021	DOE/ER/40888–T1
FG06-85ER40224	Oregon Univ., Eugene, OR (United States). Dept. of Physics	
	20:8812	SLAC-PUB–6639
	Stanford Linear Accelerator Center, Menlo Park, CA (United States)	
	20:8810	SLAC-PUB–6600
FG06-90ER40561	Washington Univ., Seattle, WA (United States)	
	20:8688	DOE/ER/40561–164
	20:8853	DOE/ER/40561–173
	Washington Univ., Seattle, WA (United States). Inst. for Nuclear Theory	
	20:8826	DOE/ER/40561–172
	20:8908	DOE/ER/40561–174
FG06-91ER14217	Washington State Univ., Richland, WA (United States)	
	20:7606	DOE/ER/14217–2
FG09-85ER13426	Georgia Univ., Athens, GA (United States). Complex Carbohydrate Research Center	
	20:8568	DOE/ER/13426–T4
FG09-86ER13621	Georgia Univ., Athens, GA (United States). Research Foundation	
	20:8579	DOE/ER/13621–T1
	20:8580	DOE/ER/13621–T2
FG09-87ER40354	Georgia Univ., Athens, GA (United States). Research Foundation	
	20:8907	DOE/ER/40354–5
FG09-94SR18445	North Carolina Agricultural and Technical State Univ., Greensboro, NC (United States)	
	20:7307	DOE/SR/18445–T1
FG21-93MC29224	USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States)	
	20:7929	DOE/METC–94/1010
FG22-89PC89774	Massachusetts Inst. of Tech., Cambridge, MA (United States)	
	20:7170	DOE/PC/89774–T11
FG22-89PC89788	Utah Univ., Salt Lake City, UT (United States)	
	20:7111	DOE/PC/89788–T15
FG22-90PC90096	Tulsa Univ., OK (United States). Center for Environmental Research and Technology	
	20:7155	DOE/PC/90096–T7
FG22-90PC90287	California Univ., Berkeley, CA (United States)	
	20:7144	DOE/PC/90287–T15
FG22-90PC90308	Brown Univ., Providence, RI (United States). Div. of Engineering	
	20:7087	DOE/PC/90308–T2
FG22-90PC90314	West Virginia Univ., Morgantown, WV (United States)	
	20:7088	DOE/PC/90314–T1
	20:7089	DOE/PC/90314–T2
	20:7090	DOE/PC/90314–T3
	20:7091	DOE/PC/90314–T4
	20:7093	DOE/PC/90314–T6
	20:7095	DOE/PC/90314–T8
	20:7166	DOE/PC/90314–T9
	West Virginia Univ., Morgantown, WV (United States). Dept. of Mineral Processing Engineering	
	20:7092	DOE/PC/90314–T5
	20:7094	DOE/PC/90314–T7
FG22-91PC91281	Auburn Univ., AL (United States). Dept. of Chemical Engineering	
	20:7131	DOE/PC/91281–T12
FG22-91PC91288	Georgia Inst. of Tech., Atlanta, GA (United States). School of Chemical Engineering	
	20:7132	DOE/PC/91288–T14
FG22-91PC91293	Massachusetts Inst. of Tech., Cambridge, MA (United States). Dept. of Chemical Engineering	
	20:8436	DOE/PC/91293–12
FG22-91PC91303	Pennsylvania State Univ., University Park, PA (United States). Dept. of Materials Science and Engineering	
	20:7145	DOE/PC/91303–T13
FG22-91PC91308	Brigham Young Univ., Provo, UT (United States)	
	20:7173	DOE/PC/91308–12
FG22-91PC91311	Auburn Univ., AL (United States). Dept. of Chemical Engineering	
	20:7133	DOE/PC/91311–T12
FG22-92BC14856	Kansas Univ., Lawrence, KS (United States). Energy Research Center	
	20:7202	DOE/BC/14856–1
FG22-92MT92018	Hampton Univ., VA (United States). Dept. of Engineering	
	20:7154	DOE/MT/92018–8
FG22-92MT92019	Grambling State Univ., LA (United States). Dept. of Chemistry	
	20:7143	DOE/MT/92019–T2
FG22-92MT92020	North Carolina Agricultural and Technical State Univ., Greensboro, NC (United States). Dept. of Chemical Engineering	
	20:7228	DOE/MT/92020–8
FG22-92PC92104	Pennsylvania State Univ., University Park, PA (United States). Coll. of Earth and Mineral Sciences	
	20:7247	DOE/PC/92104–T7
FG22-92PC92527	University of Southern California, Los Angeles, CA (United States). Dept. of Chemical Engineering	
	20:7136	DOE/PC/92527–T8
FG22-92PC92528	Stanford Univ., CA (United States). High Temperature Gasdynamics Lab.	
	20:7176	DOE/PC/92528–7
FG22-92PC92532	Kansas Univ., Lawrence, KS (United States). Dept. of Chemical and Petroleum Engineering	
	20:7567	DOE/PC/92532–T9
FG22-92PC92542	Lehigh Univ., Bethlehem, PA (United States). Energy Research Center	
	20:8078	DOE/PC/92542–T8
FG22-92PC92545	Texas A and M Univ., College Station, TX (United States). Dept. of Chemical Engineering	
	20:8182	DOE/PC/92545–8
FG22-92PC92550	Kentucky Univ., Lexington, KY (United States). Research Foundation	
	20:7137	DOE/PC/92550–8
FG22-93BC14862	Stanford Univ., CA (United States). Dept. of Petroleum Engineering	
	20:7205	DOE/BC/14862–7
FG22-93BC14875	Reservoir Engineering Research Inst., Palo Alto, CA (United States)	
	20:7206	DOE/BC/14875–5

Contract No.	Abstract No.	Report No.
FG22-93MT93005	Hampton Univ., VA (United States). Dept. of Engineering	
	20:7109	DOE/MT/93005–4
FG22-93MT93007	Morgan State Univ., Baltimore, MD (United States)	
	20:7226	DOE/MT/93007–4
FG22-93PC93202	Alabama Univ., University, AL (United States). Dept. of Chemistry	
	20:7147	DOE/PC/93202–4
FG22-93PC93203	Arkansas Univ., Little Rock, AR (United States)	
	20:7099	DOE/PC/93203–T4
FG22-93PC93213	Michigan State Univ., East Lansing, MI (United States)	
	20:7568	DOE/PC/93213–T4
FG22-93PC93221	Oklahoma Univ., Norman, OK (United States). School of Aerospace and Mechanical Engineering	
	20:7177	DOE/PC/93221–T4
FG22-93PC93223	Pennsylvania State Univ., University Park, PA (United States). Coal and Organic Petrology Labs.	
	20:7148	DOE/PC/93223–T3
FG22-93PC93225	Tennessee Univ., Tullahoma, TN (United States). Space Inst.	
	20:8140	DOE/PC/93225–4
FG22-93PC93226	Brigham Young Univ., Provo, UT (United States)	
	20:7178	DOE/PC/93226–T4
FG22-94BC14970	Oklahoma Univ., Norman, OK (United States). Center for Reservoir Characterization	
	20:7193	DOE/BC/14970–1
FG22-94BC14977	New Mexico Inst. of Mining and Technology, Socorro, NM (United States)	
	20:7220	DOE/BC/14977–1
	20:7221	DOE/BC/14977–2
FG22-94MT94011	Clark Atlanta Univ., GA (United States). Dept. of Engineering	
	20:7257	DOE/MT/94011–1
FG22-94PC93256	Electric Power Research Inst., Palo Alto, CA (United States)	
	20:7159	DOE/PC/93256–T4
	20:7160	DOE/PC/93256–T5
FG22-94PC94207	Georgia Inst. of Tech., Atlanta, GA (United States). School of Chemical Engineering	
	20:7139	DOE/PC/94207–T1
FG22-94PC94211	Western Kentucky Univ., Bowling Green, KY (United States). Dept. of Chemistry	
	20:7179	DOE/PC/94211–T1
FG22-94PC94214	Oklahoma Univ., Norman, OK (United States). School of Geology and Geophysics	
	20:7149	DOE/PC/94214–T1
FG22-94PC94227	Massachusetts Inst. of Tech., Cambridge, MA (United States)	
	20:7856	DOE/PC/94227–T1
FG45-93R551901	Energy Materials Research, Rochester Hills, MI (United States)	
	20:8141	DOE/R5/51901–T4
FG46-92R699203	Drying Technology, Inc., Silsbee, TX (United States)	
	20:8025	DOE/R6/99203–T8
W-31-109-ENG-38	Argonne National Lab., IL (United States)	
	20:7278	PATENTS-US–A7999339
	20:8553	ANL/MCS-TM–200
	20:9154	ANL/MCS-TM–198
	Gas Research Inst., Chicago, IL (United States)	
	20:7253	GRI–93/0229
W-31109-ENG-38	Argonne National Lab., IL (United States)	
	20:7289	ANL–94/33
	20:7441	ANL/CMT/PP–82412
	20:7465	ANL/EA/CP–82216
	20:7466	ANL/EA/CP–84292
	20:7467	ANL/EAD/TM–33
	20:7468	ANL/EWM/CP–83384
	20:7627	ANL/ES/CP–83413
	20:7674	ANL/ET/CP–84795
	20:7675	ANL/ET/CP–84844
	20:7698	ANL/TD/CP–85108
	20:7761	ANL/TD/CP–85106
	20:7762	ANL/TD/CP–85107
	20:7763	ANL/TD/CP–85125
	20:7826	ANL/ET/CP–82120
	20:7828	ANL/CMT/CP–82874
	20:7829	ANL/CMT/CP–83329
	20:7848	ANL/DIS/PP–83052
	20:7904	ANL/DIS/TM–21
	20:7915	ANL/CMT/CP–83639
	20:8010	ANL/ES/CP–84328
	20:8066	ANL/DIS/CP–84533
	20:8067	ANL/DIS/CP–84908
	20:8070	ANL/ET/CP–82012
	20:8071	ANL/MSD/PP–82718
	20:8104	PATENTS-US–A7983188
	20:8112	ANL/ET/CP–83901
	20:8113	ANL/ET/CP–84563
	20:8114	ANL/ET/CP–84649
	20:8115	ANL/ET/CP–84861
	20:8116	ANL/ET/PP–80280
	20:8117	ANL/MSD/CP–84398
	20:8118	ANL/MSD/CP–84413
	20:8136	ANL/MSD/CP–83568
	20:8196	ANL/CHM/CP–84392
	20:8197	ANL/CHM/PP–82180
	20:8212	ANL/EP/SUMM–84774
	20:8223	ANL/RE/PP–80322
	20:8224	ANL/RE/PP–80379
	20:8261	ANL/ASD/CP–84555
	20:8268	ANL–94/39
	20:8269	ANL/ASD/CP–83682
	20:8298	ANL/APS/TB–20
	20:8309	ANL/MSD/CP–82826
	20:8332	ANL/XFD/CP–82917
	20:8338	ANL-HEP-CP–94-75
	20:8339	ANL-HEP-CP–94-78
	20:8340	ANL-HEP-TR–94-42
	20:8341	ANL-HEP-TR–94-87
	20:8417	ANL/DIS/CP–84377
	20:8418	ANL/DIS/CP–84531
	20:8430	ANL/MCS-TM–186
	20:8552	ANL/BIM/PP–78964
	20:8572	ANL/CMB/PP–84252
	20:8607	ANL/CMB/CP–82396
	20:8608	ANL/ER–3
	20:8709	ANL-HEP-PR–94-79
	20:8776	ANL-HEP-CP–94-68
	20:8777	ANL-HEP-CP–94-76
	20:8778	ANL/PHY/CP–84618
	20:8823	ANL-HEP-CP–94-82
	20:8845	ANL/PHY/CP–84452
	20:8846	ANL/PHY/CP–84543
	20:8951	ANL/PHY/CP–84545
	20:8958	ANL/PHY/CP–84104
	20:8965	ANL/CHM/CP–84071
	20:8971	ANL/MSD/CP–83452
	20:8972	ANL/MSD/CP–84768
	20:8991	ANL/MSD/PP–83083
	20:9026	ANL/MSD/CP–82573
	20:9027	ANL/MSD/PP–83268
	20:9090	ANL/EP/SUMM–84775

Contract No.	Abstract No.	Report No.
	20:9091	ANL/EP/VU–84771
	20:9092	ANL/EP/VU–84785
	20:9093	ANL/ET/CP–82008
	20:9094	ANL/FPP/TM–272
	20:9095	ANL/FPP/TM–273
	20:9096	ANL/FPP/TM–275
	20:9104	ITER-TN-BL–5-0-3
	20:9153	ANL/MCS/CP–85098
	20:9188	ANL/DIS/CP–84374
	Brookhaven National Lab., Upton, NY (United States)	
	20:8880	BNL–61074
	USDOE Assistant Secretary for Fossil Energy, Washington, DC (United States)	
	20:7925	DOE/METC–94/1010
	20:7927	DOE/METC–94/1010
	20:7928	DOE/METC–94/1010
	20:7930	DOE/METC–94/1010
	Washington Univ., Seattle, WA (United States). Inst. for Nuclear Theory	
	20:8826	DOE/ER/40561–172
	Argonne National Lab., IL (United States). Center for Transportation Research	
	20:7849	ANL/ESD–26
	Gas Research Inst., Chicago, IL (United States). Environment and Safety Research Dept.	
	20:7252	GRI–93/0091
W-7405-ENG-36	**Los Alamos National Lab., NM (United States)**	
	20:7263	LA–12909-MS
	20:7323	LA–12889
	20:7324	LA-UR–94-3483
	20:7325	LA-UR–94-4371
	20:7477	LA–12857-ENV
	20:7478	LA–12863
	20:7817	LA–12866
	20:7832	PATENTS-US–A7981450
	20:8127	LA-UR–95-440
	20:8190	PATENTS-US–A7980888
	20:8238	LA–12831-MS
	20:8271	PATENTS-US–A7966644
	20:8294	LA-UR–94-4168
	20:8301	LA-UR–94-3753
	20:8420	LA–12752-MS
	20:8421	LA–12898-MS
	20:8423	PATENTS-US–A7980892
	20:8458	LA–12814-MS
	20:8459	LA-UR–94-3637
	20:8497	LA–12753-MS
	20:8498	LA-UR–94-3685
	20:8584	LA-UR–94-3466
	20:8681	LA-UR–94-4386
	20:8703	LA-UR–94-4196
	20:8704	LA-UR–94-4318
	20:8768	LA-UR–94-4365
	20:8937	LA-UR–94-4203
	20:8938	LA-UR–94-4343
	20:8948	LA–12884
	20:8949	LA–12885
	20:9012	LA-UR–94-4179
	20:9070	LA-UR–94-4333
	20:9176	LA-UR–94-1947
	20:9177	LA-UR–94-4339
	20:9178	LA-UR–94-4382
W-7405-ENG-48	**Brookhaven National Lab., Upton, NY (United States)**	
	20:8880	BNL–61074
	Lawrence Livermore National Lab., CA (United States)	
	20:7363	UCRL-CR–117355
	20:7364	UCRL-ID–117120
	20:7365	UCRL-ID–118009
	20:8068	UCRL-LR–114070-7
	20:8111	UCRL-ID–119235
	20:8220	UCRL-JC–118634
	20:8273	PATENTS-US–A7981636
	20:8411	PATENTS-US–A7971111
	20:8414	PATENTS-US–A7983350
	20:8426	UCRL-ID–119479
	20:8427	UCRL-ID–119551
	20:8429	UCRL-CR–116651
	20:8548	UCRL-ID–117401
	20:8645	UCRL-JC–118082
	20:8653	UCRL-JC–116575
	20:9129	UCRL–52000-94-10
	General Atomics, San Diego, CA (United States)	
	20:9049	GA-A–21872

Report Number Index

The report number index consists of the alphanumeric identifiers assigned to report literature as well as patent and conference literature cited in this publication. Entries provide the abstract number; the source(s) of availability of the document; the GPO file prefix for GPO depository library documents; the order number for OSTI and NTIS report ordering purposes; and, if the document was distributed under the DOE distribution program, the category number is shown for paper copy (PC), microfiche (MF), or no distribution (ND). These categories are included to assist DOE librarians in responding to requests for reports in their collections. The index also lists secondary numbers, with the corresponding abstract numbers and cross-references to other identifying numbers.

Report Number	*Abstract Number*	*Source of Availability*	*GPO Dep.*	*Order Number*	*Distribution Category*
ACHRE–					
95003265	20:8606	OSTI; NTIS; INIS; GPO; GPO Dep.	E 1.99:	DE95003265	MF-407
ADP–					
93/211/T129.	20:8867	*See* UM-P–93/94			
AEA-D and R–					
0891(ed.2)	20:7288	OSTI; NTIS (US Sales Only); INIS		DE95613248	
AECL–					
10851	20:7358	*See* SKB-TR–94-04			
ANL–					
94/33	20:7289	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005880	MF-721
94/39	20:8268	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006075	PC-1394
ANL-HEP-CP–					
94-68	20:8776	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005839	MF-414
94-75	20:8338	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004593	MF-414
94-76	20:8777	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004594	MF-414
94-78	20:8339	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004592	MF-414
94-82	20:8823	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004636	MF-414
ANL-HEP-PR–					
94-79	20:8709	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004625	MF-414
ANL-HEP-TR–					
94-42	20:8340	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004663	MF-414
94-87	20:8341	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004638	MF-414
ANL/APS/TB–					
20	20:8298	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005471	MF-411
ANL/ASD/CP–					
83682	20:8269	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004616	MF-411
84555	20:8261	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004596	MF-414
ANL/BIM/PP–					
78964	20:8552	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005835	MF-408
ANL/CHM/CP–					
84071	20:8965	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004602	MF-411
84392	20:8196	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004614	MF-401; MF-411
ANL/CHM/PP–					
82180	20:8197	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005831	MF-401; MF-411
ANL/CMB/CP–					
82396	20:8607	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004129	MF-408
ANL/CMB/PP–					
84252	20:8572	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004642	MF-408
ANL/CMT/CP–					
82874	20:7828	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004645	MF-1350
83329	20:7829	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE95004632	MF-1004
83639	20:7915	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004590	MF-110
ANL/CMT/PP–					
82412	20:7441	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004644	MF-2000
ANL/DIS/CP–					
84374	20:9188	OSTI; NTIS; GPO Dep.	E 1.99:	DE95002981	MF-600
84377	20:8417	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004591	
84531	20:8418	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004599	
84533	20:8066	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004600	MF-900

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
84908	20:8067	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004635	MF-900
ANL/DIS/PP–					
83052	20:7848	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004641	MF-800
ANL/DIS/TM–					
21	20:7904	OSTI; NTIS; (documentation only); ESTSC (complete software package), P.O. Box 1020, Oak Ridge, TN 37831-1020; GPO Dep.	E 1.99:	DE95006078	MF-101
ANL/EA/CP–					
82216	20:7465	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005865	MF-2000
84292	20:7466	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004650	MF-2050
ANL/EAD/TM–					
33	20:7467	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004186	MF-2050
ANL/EP/SUMM–					
84774	20:8212	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE95004626	MF-1001
84775	20:9090	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE95004619	MF-1015
ANL/EP/VU–					
84771	20:9091	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004637	MF-940
84785	20:9092	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004620	MF-424
ANL/ER–					
3	20:8608	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006146	PC-408; PC-607
ANL/ES/CP–					
83413	20:7627	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004509	MF-1400
84328	20:8010	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004617	MF-1500
ANL/ES/VU–					
84328	20:8010	*See* ANL/ES/CP–84328			
ANL/ESD–					
26	20:7849	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006854	MF-402
ANL/ET/CP–					
82008	20:9093	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004613	MF-423
82012	20:8070	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004659	MF-423
82120	20:7826	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004604	MF-1394
83901	20:8112	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004631	MF-900; MF-404
84563	20:8113	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004605	MF-1394; MF-404
84649	20:8114	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004660	MF-1393
84795	20:7674	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004628	MF-516; MF-424
84844	20:7675	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004627	MF-516; MF-424
84861	20:8115	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004639	MF-1370
ANL/ET/PP–					
80280	20:8116	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004657	MF-1391
ANL/EWM/CP–					
83384	20:7468	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004652	MF-2050
ANL/FPP/TM–					
272	20:9094	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95007019	PC-424
273	20:9095	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006852	PC-424
275	20:9096	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006148	PC-424
ANL/MCS-TM–					
186	20:8430	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005410	MF-402; MF-405
198	20:9154	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005048	MF-405
200	20:8553	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005906	MF-405; MF-408
ANL/MCS/CP–					
85098	20:9153	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004643	MF-405

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
ANL/MSD/CP–					
82573	20:9026	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004611	MF-404
82826	20:8309	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004647	MF-404; MF-406
83452	20:8971	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004653	MF-404
83568	20:8136	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004655	MF-404
84398	20:8117	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004646	MF-404
84413	20:8118	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004615	MF-404; MF-1394
84768	20:8972	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004595	MF-404
ANL/MSD/PP–					
82718	20:8071	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004629	MF-404
83083	20:8991	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004633	MF-404
83268	20:9027	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004649	MF-404
ANL/PHY/CP–					
84104	20:8958	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004597	MF-411
84452	20:8845	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005841	MF-413
84543	20:8846	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004610	MF-413
84545	20:8951	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004609	MF-411
84618	20:8778	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004658	MF-413
ANL/RE/PP–					
80322	20:8223	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004598	MF-500
80379	20:8224	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004589	MF-500
ANL/TD/CP–					
85106	20:7761	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004586	MF-910
85107	20:7762	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004585	MF-940
85108	20:7698	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004584	MF-900
85125	20:7763	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004582	MF-940
ANL/XFD/CP–					
82917	20:8332	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004656	MF-411
AS-ITP–					
94-24.	20:8790	*See* IC–94/225			
BHR–					
80	20:8469	OSTI; NTIS; INIS		DE95612398	
BNL–					
52351-Rev.12/94	20:9127	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006375	PC-900
52435	20:8310	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004856	MF-414
52443	20:7764	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005653	PC-515
52444	20:8225	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006728	PC-2000
52450	20:8646	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005654	MF-600
52452	20:7542	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006729	PC-2020
60283	20:8282	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95003946	MF-414
60429	20:8119	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95003948	MF-404
60744	20:7780	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004231	MF-515
60818	20:8419	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004843	
60883	20:8638	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95002414	MF-721
60964	20:8879	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95003950	MF-413
60978	20:7959	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004839	MF-400
60999	20:8299	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005004	MF-400
61006	20:8041	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005003	MF-2020
61007	20:8300	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95003955	MF-410
61011	20:8710	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95003962	MF-414
61014	20:8283	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95003959	MF-414
61019	20:8311	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95003949	MF-400
61053	20:8312	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004841	MF-414
61074	20:8880	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004835	MF-414
61079	20:8585	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004954	MF-402
61082	20:8333	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004842	MF-414
61083	20:8981	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004834	MF-401; MF-406
61084	20:8179	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004844	MF-401
61099	20:8824	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004838	MF-414
61114	20:8595	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004232	MF-402; MF-408
61127	20:7290	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004950	MF-2010
61136	20:8072	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004951	MF-404

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
61139	20:8711	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004953	MF-414
61141	20:8825	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004840	MF-414
61142	20:8712	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004952	MF-414
61179	20:8753	OSTI; INIS; NTIS; GPO Dep.	E 1.99:	DE95005934	MF-414
61230	20:8431	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005999	MF-402
61267	20:8284	OSTI; INIS; NTIS; GPO Dep.	E 1.99:	DE95006097	MF-414
61272	20:8415	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005958	MF-414
BNL-A–					
3259	20:7291	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005931	
BNL-NUREG–					
61147	20:7781	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004837	
BRIUG–					
0013.	20:8342	*See* CNIC–00777			
BUDKERINP–					
93-115	20:8848	OSTI; NTIS (US Sales Only); INIS		DE95613843	
93-64	20:8966	OSTI; NTIS (US Sales Only); INIS		DE95614164	
93-93	20:8713	OSTI; NTIS (US Sales Only); INIS		DE95613560	
93-94	20:8660	OSTI; NTIS (US Sales Only); INIS		DE95613370	
93-95	20:8847	OSTI; NTIS (US Sales Only); INIS		DE95613844	
93-96	20:9041	OSTI; NTIS (US Sales Only); INIS		DE95614170	
94-1	20:9042	OSTI; NTIS (US Sales Only); INIS		DE95614176	
94-47	20:8849	OSTI; NTIS (US Sales Only); INIS		DE95613845	
94-53	20:8687	OSTI; NTIS (US Sales Only); INIS		DE95613441	
94-56	20:8953	OSTI; NTIS (US Sales Only); INIS		DE95614120	
CAP–					
109-MUON-94C	20:8284	*See* BNL–61267			
CBP–					
106	20:8295	*See* LBL–36343			
CEA-R–					
5572	20:8073	OSTI; NTIS (US Sales Only); INIS		DE95612035	
5654	20:8074	OSTI; NTIS (US Sales Only); INIS		DE95615149	
CEBAF-R–					
94-002	20:8313	*See* DOE/ER/40150–281			
CERN/SPSLC–					
92/19	20:8819	*See* UM-P–92/92			
CNDC–					
0010	20:8881	*See* CNIC–00690			
0012	20:8897	*See* CNIC–00750			
CNIC–					
00690	20:8881	OSTI; NTIS (US Sales Only); INIS		DE95613991	
00750	20:8897	OSTI; NTIS (US Sales Only); INIS		DE95613323	
00766	20:8152	OSTI; NTIS (US Sales Only); INIS		DE95611763	
00769	20:7651	OSTI; NTIS (US Sales Only); INIS		DE95612847	
00774	20:8609	OSTI; NTIS (US Sales Only); INIS		DE95612557	
00777	20:8342	OSTI; NTIS (US Sales Only); INIS		DE95613002	
00779	20:9028	OSTI; NTIS (US Sales Only); INIS		DE95614466	
00782	20:7292	OSTI; NTIS (US Sales Only); INIS		DE95613235	
00784	20:9043	OSTI; NTIS (US Sales Only); INIS		DE95614186	
00786	20:8343	OSTI; NTIS (US Sales Only); INIS		DE95613069	
00793	20:8153	OSTI; NTIS (US Sales Only); INIS		DE95611881	
00796	20:8610	OSTI; NTIS (US Sales Only); INIS		DE95612492	
00798	20:8596	OSTI; NTIS (US Sales Only); INIS		DE95612542	
COG–					
93-147.	20:7358	*See* SKB-TR–94-04			
CONF-880580–		(Symposium on gas company security; Chicago, IL (United States); 2 May 1988)			
1	20:7511	*See* SAND–88-0824C			
CONF-8806240–		(Landau memorial conference on frontiers of physics; Tel Aviv (Israel); 6-10 Jun 1988)			
2	20:8296	*See* SLAC-PUB–6338			
CONF-8810273–		(US-Japan energy policy consultations meeting; Mauna Kea, HI (United States); 16-18 Oct 1988)			
	20:7888	OSTI; NTIS; INIS		DE89003853	MF-05
CONF-9109160–		(35. Human Factors Society (HFS) annual meeting; San Francisco, CA (United States); 2-6 Sep 1991)			
6	20:7752	*See* PNL-SA–19604			

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
CONF-9111175–		(2. workshop on ceramic breeder interaction; Clearwater, FL (United States); 22-23 Nov 1991)			
2	20:8212	*See* ANL/EP/SUMM–84774			
CONF-9111209–		(Beryllium technology workshop; Clearwater Beach, FL (United States); 20 Nov 1991)			
1-Vugraphs	20:9092	*See* ANL/EP/VU–84785			
CONF-9204300–		(Workshop on internal dosimetry; Atlanta, GA (United States); 6-9 Apr 1992)			
	20:8630	*See* ORAU–94/G-111			
CONF-920682–		(International symposium on weak and electromagnetic interactions in nuclei; Dubna (Russian Federation); 16-22 Jun 1992)			
4	20:8870	*See* PNL-SA–21810			
CONF-9208272–		(9. Symposium on nuclear chemistry, radiochemistry and radiation chemistry; Cuernavaca (Mexico); 16-21 Aug 1992)			
	20:8214	*See* INIS-mf–13801			
CONF-9209212–		(International Energy Agency (IEA) workshop on intense neutron sources; Karlsruhe (Germany); 21-23 Sep 1992)			
	20:7524	*See* KFK–5296			
CONF-9209490–		(Workshop on application of microtrons in nuclear physics; Plovdiv (Bulgaria); 22-24 Sep 1992)			
	20:8288	*See* JINR-D–15-93-80			
CONF-9210255–		(International workshop on ceramic breeder blanket interactions; Tokyo (Japan); 26-29 Oct 1992)			
4	20:9090	*See* ANL/EP/SUMM–84775			
CONF-9210494–		(Politics and science: the future of brown coal mining in Germany; Bonn (Germany); 6 Oct 1992)			
	20:7187	*See* INIS-mf–15077			
CONF-930181–		(Workshop on radiation protection toward the turn of the century; Paris (France); 11-13 Jan 1993)			
2	20:8631	*See* PNL-SA–21776			
CONF-9303220–		(Workshop on measurement quality assurance for ionizing radiation; Washington, DC (United States); 16-18 Mar 1993)			
4	20:8395	*See* PNL-SA–22048			
CONF-9303327–		(Winter meeting on ground water pollution; Bredsten (Denmark); 2-3 Mar 1993)			
	20:8500	*See* NEI-DK–1754			
CONF-9304229–		(2. international workshop on physics and experiments at linear e^+e^- colliders; European workshop at DESY; Waikoloa, HI (United States); 26 Apr - 3 may 1993)			
2	20:8838	*See* SLAC-PUB–6290			
CONF-9304276–		(2. international workshop on Chromosome 9; Chatham, MA (United States); 18-20 Apr 1993)			
Summ.	20:8573	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004183	MF-408
CONF-9304279–		(Advisory group meeting on problems concerning the accumulation of separated plutonium; Vienna (Austria); 26-29 Apr 1993)			
	20:7265	*See* IAEA-TECDOC–765			
CONF-9304280–		(AIAA Region 5 student conference; Ft. Collins, CO (United States); 21-24 Apr 1993)			
1	20:7621	*See* NREL/TP–441-7077			
CONF-9305399–		(7. European gas conference; Oslo (Norway); 12 May 1993)			
1	20:7250	*See* NEI-NO–470			
CONF-9305401–		(Specialists meeting on operator support systems in nuclear power plants; Moscow (Russian Federation); 17-21 May 1993)			
	20:7709	*See* IAEA-TECDOC–762			
CONF-930567–		(14. Bergen conference on oil and economics; Bergen (Norway); 10-11 May 1993)			
1	20:7194	*See* NEI-NO–472			

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
CONF-9306401–		(5. Finnish national aerosol symposium; Espoo (Finland); 1-3 Jun 1993)			
	20:8437	*See* FAAR–23/1993			
CONF-930761–		(International Europhysics conference on high-energy physics; Marseille (France); 22-28 Jul 1993)			
1	20:8400	*See* SLAC-PUB–6701			
CONF-9308154–		(4. international conference on the structure of surfaces; Shanghai (China); 16-19 Aug 1993)			
5	20:8103	*See* LBL–34612			
CONF-9308257–		(8. American Society for Testing and Materials symposium on reactors; Vail, VA (United States); 29 Aug - 3 sep 1993)			
1	20:8105	*See* PNL-SA–21635			
CONF-9308258–		(5. international conference on arabidopsis research; Columbus, OH (United States); 19-22 Aug 1993)			
Absts.	20:8597	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004460	MF-408
CONF-9310145–		(INFOTECH '93; Oak Ridge, TN (United States); 20-23 Oct 1993)			
6	20:9196	*See* WHC-SA–1769			
CONF-9310182–		(Workshop on beryllium for fusion applications; Karlsruhe (Germany); 4-5 Oct 1993)			
2-Vugraphs	20:9091	*See* ANL/EP/VU–84771			
CONF-9310220–		(Institute of Electrical and Electronic Engineers (IEEE) meeting on scalable parallel libraries; Starkville, MS (United States); 6-8 Oct 1993)			
7	20:9153	*See* ANL/MCS/CP–85098			
CONF-931023–		(ICALEPCS'93: International conference on accelerators and large experimental physics control systems; Berlin (Germany); 18-22 Oct 1993)			
13	20:8311	*See* BNL–61019			
CONF-9310297–		(3. international workshop on the identification of transcribed sequences; New Orleans, LA (United States); 2-4 Oct 1993)			
Absts.	20:8583	*See* DOE/ER/61670–1			
CONF-9310360–		(8. symposium on separation science and technology for energy applications; Gatlinburg, TN (United States); 24-28 Oct 1993)			
2	20:7244	*See* GKSS–94/E/14			
CONF-9310369–		(Report of the international workshop on quality control of monthly climate data; Asheville, NC (United States); 5-6 Oct 1993)			
Summ.	20:9194	*See* ORNL/CDIAC–69			
CONF-9310397–		(2. international workshop on sequencing by hybridization (SBH); The Woodlands, TX (United States); 28-30 Oct 1993)			
Summ.	20:8577	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004182	MF-408
CONF-9310403–		(The mining Pribram in science and technology; Pribram (Czech Republic); 13-16 Oct 1993)			
	20:7446	*See* INIS-mf–14436			
	20:9165	*See* INIS-mf–14435			
CONF-9310404–		(Specialists meeting on current practices and future trends in expert system developments for use in the nuclear industry; Tel Aviv (Israel); 11-15 Oct 1993)			
	20:7739	*See* IAEA-TECDOC–769			
CONF-9310405–		(Technical committee meeting on safe handling, transport and storage of plutonium; Vienna (Austria); 18-21 Oct 1993)			
	20:7702	*See* IAEA-TECDOC–766			
CONF-931077–		(International conference on superconductivity and strongly correlated electron systems; Amalfi (Italy); 14-16 Oct 1993)			
1	20:9029	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005929	MF-410; MF-404
CONF-9311278–		(ATV meeting on research projects on ground water pollution; Lyngby (Denmark); 17 Nov 1993)			
	20:8505	*See* NEI-DK–1755			

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
CONF-9311279–		(Offshore pipelines; Haugesund (Norway); 30 Nov 1993)			
1	20:7245	*See* NEI-NO–471			
CONF-9401111–		(System prioritization method (SPM) workshop; Carlsbad, NM (United States); 9 Jan 1994)			
1-Rev.1	20:7293	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004830	MF-700
CONF-9402123–		(Workshop on parallel processing; Budapest (Hungary); 10-11 Feb 1994)			
	20:9173	*See* KFKI–1994-09/M-N			
CONF-940225–		(Waste management '94; Tucson, AZ (United States); 27 Feb - 3 mar 1994)			
126	20:7345	*See* PNL-SA–21497			
CONF-9403122–		(INS symposium; Tokyo (Japan); 8-10 Mar 1994)			
4	20:8734	*See* LBL–36175			
CONF-9403139–		(Workshop on harmonic oscillators; Cocoyoc (Mexico); 23-25 Mar 1994)			
2	20:8715	*See* DOE/ER/40291–23			
CONF-9403172–		(US-Japan joint seminar on classical and molecular cytogenetic analysis of cereal genomes; Manhattan, KS (United States); Mar 1994)			
1	20:8584	*See* LA-UR–94-3466			
CONF-9403191–		(26. Meeting of experts on lightning protection of wind turbine generator systems and EMC problems in the associated control systems; Cologno Monzese (Italy); 8-9 Mar 1994)			
	20:7611	*See* NEI-DK–1795			
CONF-9403194–		(Status report of Projekt Nukleare Sicherheitsforschung (PSF) of Kernforschungszentrum Karlsruhe GmbH (KfK); Karlsruhe (Germany); 23 Mar 1994)			
	20:7788	*See* KFK–5326			
CONF-9403197–		(IPCC WG 3 writing team 2 meeting; Montreux (Switzerland); 3-6 Mar 1994)			
	20:7890	*See* PSI–94-10			
CONF-9403198–		(La Thuile conference on elementary particles; Aosta Valley (Italy); 7-12 Mar 1994)			
1	20:8714	*See* DOE/ER/40291–22			
CONF-9404100–		(Symposium on the non-proliferation experiment results and implications for test ban treaties; Rockville, MD (United States); 19-21 Apr 1994)			
14	20:8428	*See* LBL–35944			
15	20:8422	*See* LBL–35946			
CONF-9404102–		(12. geothermal program review: geothermal's role in global climate change - impacts on the Climate Change Action Plan; San Francisco, CA (United States); 25-28 Apr 1994)			
	20:7607	*See* DOE/GO–10094-005			
5	20:7608	*See* EGG-M–94185			
CONF-9404198–		(Workshop on atomic physics at high brilliance synchrotron sources; Argonne, IL (United States); 23-24 Apr 1994)			
4	20:8965	*See* ANL/CHM/CP–84071			
CONF-940420–		(18. L.H. Gray conference on radiation damage in DNA: physics, chemistry and molecular biology; Bath (United Kingdom); 10-14 Apr 1994)			
1	20:8632	*See* PNL-SA–24024			
CONF-9404202–		(Physical colloquium of Hamburg University; Hamburg (Germany); 14 Apr 1994)			
2	20:8645	*See* UCRL-JC–118082			
CONF-9404227–		(14. TRIGA users conference; San Diego, CA (United States); Apr 1994)			
1	20:7765	OSTI; NTIS; GPO Dep.	E 1.99:	DE95003934	MF-400
CONF-9404228–		(2. international workshop on B-physics at hadron machines (Beauty '94); Le Mont St. Michel (France); 24-29 Apr 1994)			
1	20:8787	*See* FNAL/C–94/252-E			

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
CONF-940450–		(Field application in situ combustion practices: past, present and future applications; Tulsa, OK (United States); 21-22 Apr 1994)			
	20:7227	*See* NIPER/BDM–0086			
CONF-9405162–		(Symposium on particles, strings and cosmology; Syracuse, NY (United States); 19-24 May 1994)			
2	20:8735	*See* SLAC-PUB–6640			
CONF-9405204–		(Quantum complexity in mesoscopic systems; Los Alamos, NM (United States); 16-20 May 1994)			
3	20:8681	*See* LA-UR–94-4386			
CONF-9405247–		(Harmony of physics conference; Philadelphia, PA (United States); 8-9 May 1994)			
2	20:8951	*See* ANL/PHY/CP–84545			
CONF-9405270–		(49. annual quality congress; Cincinnati, OH (United States); 22-24 May 1994)			
1	20:9150	*See* SAND–94-3122C			
CONF-9405275–		(4. IKETANI conference on optically nonlinear organic materials and applications; Kamuela, HI (United States); 16-18 May 1994)			
1	20:8705	*See* LBL–36050			
CONF-9405276–		(Lasers for RF guns; Anaheim, CA (United States); 14-15 May 1994)			
	20:8310	*See* BNL–52435			
CONF-9406131–		(Coal-fired power systems: advances in IGCC and PFBC review meeting; Morgantown, WV (United States); 21-23 Jun 1994)			
66	20:7108	*See* DOE/METC/C–94/7150			
CONF-9406171–		(3. international workshop on ceramic breeder blanket interactions; Los Angeles, CA (United States); 22-24 Jun 1994)			
4	20:7674	*See* ANL/ET/CP–84795			
5	20:9124	*See* PNL-SA–24129			
CONF-940618–		(4. European particle accelerator conference; London (United Kingdom); 27 Jun - 1 jul 1994)			
114	20:8327	*See* SLAC-PUB–6566			
115	20:8306	*See* SLAC-PUB–6527			
116	20:8284	*See* BNL–61267			
CONF-9406269–		(Snowmass 94: particle and astrophysics in the next millenium; Snowmass, CO (United States); 29 Jun - 14 jul 1994)			
3	20:8823	*See* ANL-HEP-CP–94-82			
CONF-9406270–		(21. EPS conference on controlled fusion and plasma physics; Montpellier (France); 27 Jun - 1 jul 1994)			
1	20:9079	*See* PPPL–3029			
CONF-9406273–		(Tennessee international symposium on radiative corrections; Gatlinburg, TN (United States); 27 Jun - 1 jul 1994)			
4	20:8770	*See* SLAC-PUB–6700			
CONF-9406274–		(NATO Advanced Research workshop on hot hadronic matter: theory and experiment; Divonne-les-Bains (France); 27 Jun - 1 jul 1994)			
4	20:8880	*See* BNL–61074			
CONF-9406292–		(INFN elosiatron workshop on quantum-like models and coherent effects; Erice (Italy); 13-20 Jun 1994)			
1	20:8300	*See* BNL–61007			
CONF-9406294–		(Royal Society/CIBA foundation meeting on trends in muonium chemistry; London (United Kingdom); 10 Jun 1994)			
1	20:8196	*See* ANL/CHM/CP–84392			
CONF-940657–		(17. symposium on effects of radiation on materials; Sun Valley, ID (United States); 20-23 Jun 1994)			
7	20:9093	*See* ANL/ET/CP–82008			
8	20:8070	*See* ANL/ET/CP–82012			

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
CONF-940654–		(ISFNT-3: 3rd international symposium on fusion nuclear technology; Los Angeles, CA (United States); 27 Jun - 1 jul 1994)			
35	20:7675	*See* ANL/ET/CP–84844			
CONF-940681–		(Advanced accelerator concepts workshop; Lake Geneva, WI (United States); 13-18 Jun 1994)			
5	20:8304	*See* LBL–36233			
6	20:8295	*See* LBL–36343			
7	20:8326	*See* SLAC-PUB–95-6745			
CONF-9407103–		(International conference on accelerator-driven transmutation technologies and applications; Las Vegas, NV (United States); 25-28 Jul 1994)			
33	20:7325	*See* LA-UR–94-4371			
CONF-9407129–		(7. Marcel Grossman meeting on general relativity; Stanford, CA (United States); 24-29 Jul 1994)			
4	20:8737	*See* SLAC-PUB–6673			
CONF-9407135–		(QCD 94: nuclear physics B; Montpellier (France); 7-13 Jul 1994)			
2	20:8769	*See* SLAC-PUB–6658			
3	20:8817	*See* SLAC-PUB–6659			
4	20:8814	*See* SLAC-PUB–6647			
CONF-940714–		(International meeting on synchrotron radiation instrumentation; Stony Brook, NY (United States); 18-22 Jul 1994)			
46	20:8309	*See* ANL/MSD/CP–82826			
47	20:8981	*See* BNL–61083			
CONF-9407142–		(ICHEP '94; Glasgow (United Kingdom); 20-27 Jul 1994)			
4	20:8813	*See* SLAC-PUB–6645			
5	20:8828	*See* FNAL/C–94/368-E			
6	20:8827	*See* FNAL/C–94/337-E			
7	20:8785	*See* FNAL/C–94/144-E			
8	20:8348	*See* FNAL/C–94/379-E			
CONF-9407153–		(Superconductivity program for electric power systems; Alexandria, VA (United States); 19-20 Jul 1994)			
Vol.1	20:9030	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005058	MF-1390
Vol.2	20:9031	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005059	MF-1390
CONF-9407154–		(COSPAR '94; Hamburg (Germany); 11-21 Jul 1994)			
1	20:8607	*See* ANL/CMB/CP–82396			
CONF-9407156–		(Physics and materials science of high-temperature superconductors; Porto Carras (Greece); 10-23 Jul 1994)			
1	20:8114	*See* ANL/ET/CP–84649			
CONF-9407157–		(International conference on the history of original ideas and basic discoveries in particle physics; Erice (Italy); 29 Jul - 4 aug 1994)			
1	20:8824	*See* BNL–61099			
2	20:8839	*See* SLAC-PUB–6584			
CONF-9407158–		(Law and prediction in natural science in the light of new knowledge from chaos research; Salzburg (Austria); 7-10 Jul 1994)			
1	20:8682	*See* SLAC-PUB–6718			
CONF-9407160–		(8. international symposium on transport phenomena in combustion; San Francisco, CA (United States); 16-20 Jul 1994)			
1	20:8220	*See* UCRL-JC–118634			
CONF-940722–		(27. international conference on high energy physics; Glasgow (United Kingdom); 21-27 Jul 1994)			
37	20:8805	*See* SLAC-PUB–6550			
38	20:8804	*See* SLAC-PUB–6549			
39	20:8716	*See* DOE/ER/40291–24			
40	20:8717	*See* DOE/ER/40291–25			

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
CONF-940725–		(International conference on hypernuclear and strange particle physics; Vancouver (Canada); 4-8 Jul 1994)			
5	20:8879	*See* BNL–60964			
CONF-940802–		(World congress on medical physics and biomedical engineering jointly with the international conference on medical physics; Rio de Janeiro (Brazil); 22-26 Aug 1994)			
2-Vugraphs	20:8950	*See* SLAC-PUB–6625			
CONF-9408125–		(17. international LINAC conference; Tsukuba (Japan); 21-26 Aug 1994)			
45	20:8297	*See* SLAC-PUB–6646			
46	20:8307	*See* SLAC-PUB–6604			
47	20:8328	*See* SLAC-PUB–6617			
48	20:8308	*See* SLAC-PUB–6621			
CONF-940813–		(208. American Chemical Society national meeting; Washington, DC (United States); 21-26 Aug 1994)			
33	20:8192	*See* PNL-SA–25345			
35	20:7425	*See* WSRC-MS–94-0203P			
CONF-9408131–		(8. international conference on x-ray absorption fine structure; Berlin (Germany); 28 Aug - 2 sep 1994)			
5	20:8179	*See* BNL–61084			
CONF-9408146–		(16. international free electron laser conference; Stanford, CA (United States); 21-26 Aug 1994)			
14	20:8270	*See* LBL–36055			
CONF-940815–		(International nuclear and hazardous waste management conference; Atlanta, GA (United States); 14-18 Aug 1994)			
103	20:7347	*See* PNL-SA–23723			
104	20:7346	*See* PNL-SA–23718			
105	20:7452	*See* PNL-SA–23775			
CONF-940816–		(Meeting of the Division of Particles and Fields of the American Physical Society; Albuquerque, NM (United States); 2-6 Aug 1994)			
68	20:8788	*See* FNAL/C–94/293-E			
69	20:8818	*See* SLAC-PUB–6674			
70	20:8736	*See* SLAC-PUB–6662			
71	20:8815	*See* SLAC-PUB–6648			
72	20:8399	*See* SLAC-PUB–6669			
73	20:8816	*See* SLAC-PUB–6653			
74	20:8281	*See* SLAC-PUB–6735			
75	20:8811	*See* SLAC-PUB–6602			
76	20:8808	*See* SLAC-PUB–6598			
77	20:8809	*See* SLAC-PUB–6599			
78	20:8810	*See* SLAC-PUB–6600			
79	20:8807	*See* SLAC-PUB–6597			
80	20:8806	*See* SLAC-PUB–6591			
81	20:8812	*See* SLAC-PUB–6639			
82	20:8786	*See* FNAL/C–94/209-E			
88	20:8753	*See* BNL–61179			
CONF-9408168–		(American Chemical Society symposium on scientific issues related to safety treatment of waste tanks; Atlanta, GA (United States); 21-26 Aug 1994)			
2	20:7349	*See* PNL-SA–24027			
3	20:7348	*See* PNL-SA–23952			
CONF-9408190–		(Tau-Charm factory in the era of B-factories and CESR conference; Workshop on hadron physics at e^+e^{minus} colliders at IEHP; Stanford, CA (United States); Beijing (China); 15-16 Aug 1994; 14-18 oct 1994)			
2	20:8738	*See* SLAC-PUB–6685			
CONF-9408196–		(FEL '94: nuclear instrument methods; Stanford, CA (United States); 21-26 Aug 1994)			
2	20:8294	*See* LA-UR–94-4168			

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
CONF-9408198--		(IAU169 conference on unsolved problems of the milky way; The Hague (Netherlands); 23-27 Aug 1994)			
1	20:8689	*See* FNAL/C--94/373			
CONF-9408199--		(NATO Advanced Study Institute on the molecular ecology of aquatic microbes; Tuscany (Italy); 28 Aug - 8 sep 1994)			
1	20:8595	*See* BNL--61114			
CONF-9408202--		(SIGCOMM 1994 conference; London (United Kingdom); 27 Aug - 4 sep 1994)			
1	20:9179	*See* LBL--35179			
2	20:9180	*See* LBL--35238			
CONF-9408203--		(Annual physics conference of Iran; Sanandaj (Iran, Islamic Republic of); 19 Aug - 1 sep 1994)			
	20:8655	*See* INIS-mf--14440			
CONF-940858--		(International conference on physics with GeV particle beams; Juelich (Germany); 22-25 Aug 1994)			
1	20:8778	*See* ANL/PHY/CP--84618			
CONF-940859--		(5. international symposium on robotics and manufacturing; Maui, HI (United States); 14-18 Aug 1994)			
29	20:8244	*See* PNL-SA--24072			
CONF-940883--		(Fuel cells '94; Morgantown, WV (United States); 17-19 Aug 1994)			
8	20:7915	*See* ANL/CMT/CP--83639			
CONF-940903--		(22. European congress on molecular spectroscopy; Essen (Germany); 11-16 Sep 1994)			
1	20:8992	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005898	MF-404
CONF-9409103--		(International symposia on high energy spin physics and polarization phenomena in nuclear physics; Bloomington, IN (United States); 15-22 Sep 1994)			
10	20:8330	*See* SLAC-PUB--6702			
11	20:8338	*See* ANL-HEP-CP--94-75			
12	20:8777	*See* ANL-HEP-CP--94-76			
13	20:8329	*See* SLAC-PUB--6694			
CONF-9409107--		(International meeting on reduced enrichment for research and test reactors; Williamsburg, VA (United States); 18-22 Sep 1994)			
4	20:7763	*See* ANL/TD/CP--85125			
5	20:7762	*See* ANL/TD/CP--85107			
6	20:7698	*See* ANL/TD/CP--85108			
7	20:7761	*See* ANL/TD/CP--85106			
CONF-9409178--		(American Chemical Society meeting on industrial and engineering chemistry; Atlanta, GA (United States); 19-21 Sep 1994)			
12	20:7350	*See* PNL-SA--24672			
CONF-9409186--		(8. system administration conference; San Diego, CA (United States); 21-23 Sep 1994)			
2	20:9187	*See* SLAC-PUB--6567			
CONF-940920--		(13. international symposium on chemical reaction engineering; Baltimore, MD (United States); 25 Sep 1994)			
1	20:7571	*See* PNL-SA--24417			
CONF-9409224--		(Biomass pyrolysis oil properties and combustion meeting; Estes Park, CO (United States); 26-28 Sep 1994)			
1	20:7560	*See* SAND--94-8780			
CONF-9409241--		(NEEDS '94; Los Alamos, NM (United States); 12-16 Sep 1994)			
5	20:9178	*See* LA-UR--94-4382			
7	20:8704	*See* LA-UR--94-4318			
CONF-9409257--		(24. international symposium on multiparticle dynamics; Vietri sul Mare (Italy); 12-19 Sep 1994)			
2	20:8709	*See* ANL-HEP-PR--94-79			
3	20:8789	*See* FNAL/C--94/404-E			

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
CONF-940926–		(7. conference on superconductivity and applications; Buffalo, NY (United States); 7-9 Sep 1994)			
3	20:8117	*See* ANL/MSD/CP–84398			
4	20:8118	*See* ANL/MSD/CP–84413			
CONF-9409268–		(5. international conference on calorimetry in high energy physics; Upton, NY (United States); 25 Sep - 1 oct 1994)			
3	20:8339	*See* ANL-HEP-CP–94-78			
CONF-9409269–		(Lattice '94; Bielefeld (Germany); 25 Sep - 1 oct 1994)			
1	20:8710	*See* BNL–61011			
2	20:8711	*See* BNL–61139			
3	20:8712	*See* BNL–61142			
4	20:8768	*See* LA-UR–94-4365			
CONF-9409272–		(1. workshop on accelerator based boron capture neutron therapy; Jackson, WY (United States); 12-14 Sep 1994)			
1	20:8593	*See* PNL-SA–25339			
CONF-9409277–		(3. workshop on tau lepton physics; Montreux (Switzerland); 19-22 Sep 1994)			
1	20:8840	*See* SLAC-PUB–6730			
2	20:8825	*See* BNL–61141			
3	20:8783	*See* DOE/ER/40291–26			
CONF-9409278–		(GVIS '94: graphics and visualization conference; Richland, WA (United States); 8 Sep 1994)			
3	20:9186	*See* PNL-SA–25031			
CONF-9409280–		(Astronomical data acquisition software system conference; Baltimore, MD (United States); 25-28 Sep 1994)			
1	20:8690	*See* FNAL/C–94/397			
CONF-9409287–		(Joint US/Polish workshop on physics from planck scale to electroweak scale; Meeting of the Division of Particles and Fields of the American Physical Society; Warsaw (Poland); Albuquerque, NM (United States); 21-24 Sep 1994; 2-6 aug 1994)			
1	20:8753	*See* BNL–61179			
CONF-940933–		(15. international conference on plasma physics and controlled nuclear fusion research; Seville (Spain); 26 Sep - 1 oct 1994)			
	20:9071	*See* LRP–504/94			
24	20:9048	*See* GA-A–21834			
25	20:9089	*See* PPPL-CFP–3185			
CONF-940963–		(International seminar on high-energy physics problems: relativistic nuclear physics and QCD; Dubna (Russian Federation); 13-17 Sep 1994)			
1	20:8776	*See* ANL-HEP-CP–94-68			
CONF-940974–		(Meeting on clusters in nuclear structures and dynamics; Strasbourg (France); 6-9 Sep 1994)			
1	20:8846	*See* ANL/PHY/CP–84543			
2	20:8845	*See* ANL/PHY/CP–84452			
CONF-941001–		(41. annual American Vacuum Society symposium; Denver, CO (United States); 24-28 Oct 1994)			
9	20:8332	*See* ANL/XFD/CP–82917			
10	20:8333	*See* BNL–61082			
CONF-941007–		(Joint power generation conference; Phoenix, AZ (United States); 2-6 Oct 1994)			
4	20:8038	*See* PNL-SA–24367			
CONF-9410114–		(3. international symposium on supercritical fluids; Strasbourg (France); 17-19 Oct 1994)			
3	20:8055	*See* PNL-SA–24553			
4	20:8191	*See* PNL-SA–24552			
5	20:8464	*See* PNL-SA–24394			
CONF-941013–		(Applied superconductivity conference; Boston, MA (United States); 16-21 Oct 1994)			
18	20:7826	*See* ANL/ET/CP–82120			
19	20:8113	*See* ANL/ET/CP–84563			

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
20	20:8115	*See* ANL/ET/CP–84861			
21	20:9026	*See* ANL/MSD/CP–82573			
CONF-9410132–		(Microcontamination '94; San Jose, CA (United States); 5-6 Oct 1994)			
4	20:8149	*See* SAND–94-2944C			
CONF-941014–		(Topical conference on the critical state in superconductors; Honolulu, HI (United States); 24-26 Oct 1994)			
2	20:8119	*See* BNL–60429			
CONF-9410141–		(Office of Scientific and Technical Information INFOTECH '94; Oak Ridge, TN (United States); 25-26 Oct 1994)			
4	20:9188	*See* ANL/DIS/CP–84374			
6	20:9160	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005067	MF-405
CONF-9410147–		(35. ORNL/DOE analytical chemistry in energy technology conference; Gatlinburg, TN (United States); 6-8 Oct 1994)			
3	20:7352	*See* PNL-SA–24741			
CONF-9410155–		(26. annual symposium on optical materials for high power lasers: Boulder damage symposium; Boulder, CO (United States); 24-26 Oct 1994)			
1	20:8131	*See* SAND–94-2617C			
CONF-941016–		(Materials week '94; Rosemont, IL (United States); 3-7 Oct 1994)			
2	20:7351	*See* PNL-SA–24698			
5	20:8075	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005897	MF-1425
CONF-9410165–		(Neutron scattering; Sendai (Japan); 11-14 Oct 1994)			
10	20:8982	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005894	MF-404; MF-411
CONF-941017–		(4. conference on radiation protection and dosimetry; Orlando, FL (United States); 24-27 Oct 1994)			
5	20:8398	*See* PNL-SA–24144			
6	20:8396	*See* PNL-SA–24009			
7	20:8397	*See* PNL-SA–24010			
CONF-9410187–		(Shock and vibration symposium; San Diego, CA (United States); 31 Oct 1994)			
4	20:8424	*See* SAND–94-1990C			
CONF-9410204–		(1994 Ingres world; Chicago, IL (United States); 2-6 Oct 1994)			
2	20:8417	*See* ANL/DIS/CP–84377			
CONF-9410216–		(22. transactions of the water reactor safety information meeting; Bethesda, MD (United States); 24-26 Oct 1994)			
1	20:7823	*See* SAND–94-2709C			
2	20:7649	*See* SAND–94-2163			
3	20:7650	*See* SAND–94-2170C			
CONF-9410219–		(Beam instrumentation workshop; Vancouver (Canada); 2-6 Oct 1994)			
23	20:8269	*See* ANL/ASD/CP–83682			
CONF-9410231–		(8. Deneb user group meeting; Detroit, MI (United States); 10-14 Oct 1994)			
2	20:7353	*See* PNL-SA–25050			
CONF-9410237–		(1994 Geographic Information Systems/Land Information Systems (GIS/LIS); Phoenix, AZ (United States); 25-27 Oct 1994)			
2	20:7503	*See* WSRC-MS–94-0418			
CONF-9410249–		(International conference on plasma physics; Foz do Igacu (Brazil); 31 Oct - 4 nov 1994)			
2	20:9049	*See* GA-A–21872			
CONF-9410256–		(Society of Automotive Engineers' convergence '94; Detroit, MI (United States); 18-27 Oct 1994)			
2	20:8062	*See* NREL/TP–473-7026			
CONF-9410264–		(International conference on human factors research in nuclear power operation; Berlin (Germany); 31 Oct - 2 nov 1994)			
1	20:7780	*See* BNL–60744			

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
CONF-9410265–		(Continuing legal education seminar on legal implications for business of the chemical weapons convention; Philadelphia, PA (United States); 21 Oct 1994)			
1	20:8066	*See* ANL/DIS/CP–84533			
2	20:8418	*See* ANL/DIS/CP–84531			
CONF-9410269–		(Ceramics and advanced materials symposium; Albuquerque, NM (United States); 31 Oct 1994)			
1	20:8106	*See* SAND–94-1810C			
CONF-9410270–		(Federation of tax administrators revenue estimating and tax research conference; Albuquerque, NM (United States); 23-26 Oct 1994)			
1	20:7251	*See* PNL-SA–25145			
CONF-9410275–		(Interaction of charged particles and radiation with matter; Oak Ridge, TN (United States); 23-25 Oct 1994)			
1	20:8958	*See* ANL/PHY/CP–84104			
CONF-9410277–		(Tau-Charm factory in the era of B-factories and CESR conference; Workshop on hadron physics at $e^{+}e^{minus}$ colliders at IEHP; Stanford, CA (United States); Beijing (China); 15-16 Aug 1994; 14-18 oct 1994)			
1	20:8738	*See* SLAC-PUB–6685			
CONF-9410287–		(5. astrophysics conference; College Park, MD (United States); 10-12 Oct 1994)			
3	20:8703	*See* LA-UR–94-4196			
CONF-9410291–		(Performance tuning for parallel computing systems; Cape Cod, MA (United States); 3-5 Oct 1994)			
1	20:9177	*See* LA-UR–94-4339			
CONF-941039–		(2. international conference on nanostructured materials; Stuttgart (Germany); 3-7 Oct 1994)			
2	20:8136	*See* ANL/MSD/CP–83568			
3	20:8971	*See* ANL/MSD/CP–83452			
CONF-941043–		(1994 annual meeting of the Geothermal Resources Council: restructuring the geothermal industry; Salt Lake City, UT (United States); 2-5 Oct 1994)			
6	20:7605	*See* LBL–36208			
CONF-941060–		(4. international conference on advanced technology and particle physics; Como (Italy); 3-7 Oct 1994)			
1	20:8347	*See* FNAL/C–94/307			
CONF-941061–		(Nuclear science symposium: medical imaging conference; Norfolk, VA (United States); 30 Oct - 5 nov 1994)			
6	20:8459	*See* LA-UR–94-3637			
12	20:8282	*See* BNL–60283			
13	20:7453	*See* PNL-SA–24176			
14	20:8393	*See* LBL–36287			
15	20:8401	*See* SLAC-PUB–6731			
CONF-941063–		(186. meeting of the Electrochemical Society; Miami, FL (United States); 9-14 Oct 1994)			
1	20:7828	*See* ANL/CMT/CP–82874			
CONF-941070–		(Computer supported cooperative symposium; Chapel Hill, NC (United States); 22-26 Oct 1994)			
2	20:9185	*See* PNL-SA–23824			
CONF-941088–		(Annual meeting of the Geological Society of America; Seattle, WA (United States); 24-27 Oct 1994)			
1	20:7294	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005963	MF-2010
CONF-941091–		(25. Project Management Institute annual seminar and symposium; Vancouver (Canada); 17-19 Oct 1994)			
3	20:7487	*See* PNL-SA–23839			

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
CONF-941101–		(Meeting of the Division of Plasma Physics of the American Physical Society; Minneapolis, MN (United States); 7-11 Nov 1994)			
2	20:8303	*See* LBL–36180			
CONF-9411105–		(40. anniversary conference on bioassay, analytical and environmental radiochemistry; Cincinnati, OH (United States); 15-17 Nov 1994)			
2	20:8633	*See* PNL-SA–25192			
CONF-9411120–		(4. Tamura symposium on accelerator physics; Austin, TX (United States); 14-16 Nov 1994)			
3	20:8305	*See* LBL–36302			
CONF-9411135–		(ASPENWORLD 94; Boston, MA (United States); 6-9 Nov 1994)			
3	20:7371	*See* WHC-SA–2407			
CONF-9411144–		(Optical sensing for environmental and process monitoring; McLean, VA (United States); 7-10 Nov 1994)			
1	20:7324	*See* LA-UR–94-3483			
CONF-9411152–		(International Atomic Energy Agency (IAEA) technical committee meeting on drivers for inertial confinement fusion; Paris (France); 14-18 Nov 1994)			
2	20:9126	*See* SAND–94-1392C			
3	20:9123	*See* LBL–35635			
CONF-9411160–		(21. proton therapy cooperative group (PTCOG) meeting; Chiba (Japan); 14-16 Nov 1994)			
1	20:8283	*See* BNL–61014			
CONF-9411163–		(Regional seminar on the national implementation of the chemical weapons convention; Jakarta (Indonesia); 28 Nov 1994)			
1	20:8067	*See* ANL/DIS/CP–84908			
CONF-9411164–		(International workshop on the motor vehicle and the global environment problem; Tokyo (Japan); 2 Nov 1994)			
1	20:8010	*See* ANL/ES/CP–84328			
CONF-9411165–		(2. EPA/JAERI workshop; Tokai (Japan); 9-11 Nov 1994)			
1	20:7466	*See* ANL/EA/CP–84292			
CONF-9411166–		(1. annual spacecraft thermal control symposium; Albuquerque, NM (United States); 16-18 Nov 1994)			
1	20:8257	*See* SAND–94-2064C			
CONF-9411167–		(Ecological risk assessment: uses and abuses conference; Corvallis, OR (United States); 15-16 Nov 1994)			
1	20:7866	*See* SAND–94-3062C			
CONF-9411172–		(Nanoparticulates '94 conference; Monterey, CA (United States); 14-15 Nov 1994)			
1	20:8972	*See* ANL/MSD/CP–84768			
CONF-9411173–		(IEEE nuclear science symposium; Norfolk, VA (United States); 1-5 Nov 1994)			
1	20:8409	*See* PNL-SA–24344			
2	20:8392	*See* LBL–36273			
CONF-9411177–		(Energy days 94; Villigen (Switzerland); 10-11 Nov 1994)			
Absts.	20:7834	OSTI; NTIS		DE95743548	
CONF-9411182–		(1. international symposium for evaluation of current trends in fusion research; Washington, DC (United States); 14-18 Nov 1994)			
2	20:9070	*See* LA-UR–94-4333			
CONF-9411185–		(NEANC specialist's meeting on measurement, calculation, and evaluation of photon production data; Bologna (Italy); 9-11 Nov 1994)			
1	20:8937	*See* LA-UR–94-4203			
CONF-9411186–		(1. IAEA research coordination meeting on measurement, calculation and evaluation of photon production data; Bologna (Italy); 14-17 Nov 1994)			
1	20:8938	*See* LA-UR–94-4343			

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
CONF-941124–		(33. Hanford symposium on health and the environment: symposium on in-situ remediation–scientific basis for current and future technologies; Richland, WA (United States); 7-11 Nov 1994)			
9	20:7438	*See* WSRC-TR–94-0462			
CONF-941129–		(13. international conference on the application of accelerators in research and industry; Denton, TX (United States); 7-10 Nov 1994)			
11	20:8261	*See* ANL/ASD/CP–84555			
CONF-941142–		(American Society of Mechanical Engineers' winter annual meeting; Chicago, IL (United States); 9-11 Nov 1994)			
27	20:8148	*See* SAND–94-2831C			
28	20:7627	*See* ANL/ES/CP–83413			
29	20:7465	*See* ANL/EA/CP–82216			
CONF-941144–		(1994 fall meeting of the Materials Research Society (MRS); Boston, MA (United States); 28 Nov - 2 dec 1994)			
19	20:8108	*See* SAND–95-8455C			
20	20:8112	*See* ANL/ET/CP–83901			
21	20:7829	*See* ANL/CMT/CP–83329			
22	20:8107	*See* SAND–94-3047C			
23	20:8146	*See* SAND–94-1692C			
24	20:8145	*See* SAND–94-1653C			
25	20:7231	*See* PNL-SA–24557			
26	20:8144	*See* PNL-SA–25425			
27	20:8175	*See* SAND–94-3147C			
33	20:8147	*See* SAND–94-1703C			
37	20:8193	*See* SAND–94-1693C			
43	20:8980	*See* SAND–94-3070C			
53	20:8076	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005895	MF-404
54	20:9012	*See* LA-UR–94-4179			
CONF-941182–		(6. international Toki conference on plasma physics and controlled nuclear fusion: Research for advanced concepts in magnetic fusion; Toki-city (Japan); 29 Nov - 2 dec 1994)			
1	20:9045	*See* DOE/ER/53198–254			
CONF-941186–		(Joint US-CERN-Japan topical course on accelerator physics and technology: frontiers of accelerator technology; Maui, HI (United States); 3-9 Nov 1994)			
1	20:8301	*See* LA-UR–94-3753			
CONF-941196–		(2. ANS workshop on the safety of Soviet-designed nuclear power plants in conjunction with the winter meeting of the American Nuclear Society; Washington, DC (United States); 12-13 Nov 1994)			
2	20:7468	*See* ANL/EWM/CP–83384			
CONF-941203–		(1. world conference on photovoltaic energy conversion; Waikoloa, HI (United States); 5-9 Dec 1994)			
1	20:7591	*See* SAND–94-1570C			
8	20:7587	*See* SAND–94-1546C			
9	20:7589	*See* SAND–94-1562C			
10	20:7590	*See* SAND–94-1563C			
12	20:7595	*See* SAND–94-3077C			
13	20:7593	*See* SAND–94-1597C			
14	20:7596	*See* SAND–94-3078C			
15	20:7592	*See* SAND–94-1571C			
16	20:7588	*See* SAND–94-1557C			
17	20:7598	*See* NREL/TP–411-7402			
19	20:7594	*See* SAND–94-1613C			
CONF-941207–		(Spent nuclear fuel meeting: challenges and initiatives; Salt Lake City, UT (United States); 14-16 Dec 1994)			
16	20:7372	*See* WHC-SA–2505			
CONF-941210–		(Power generation conference; Orlando, FL (United States); 7-9 Dec 1994)			
2	20:7620	*See* NREL/TP–440-7224			

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
CONF-941214–		(16. US Department of Energy low-level radioactive waste management conference; Phoenix, AZ (United States); 13-15 Dec 1994)			
1	20:8498	*See* LA-UR–94-3685			
CONF-941218–		(17. world energy engineering congress and the 4th environmental technology congress and expo; Atlanta, GA (United States); 7-9 Dec 1994)			
2	20:7586	*See* NREL/TP–472-7023			
CONF-941227–		(5. symposium on current issues related to nuclear power plant structure, equipment and piping; Orlando, FL (United States); 14-16 Dec 1994)			
4	20:7781	*See* BNL-NUREG–61147			
CONF-941246–		(2. annual EM cost management conference; San Francisco, CA (United States); 5-9 Dec 1994)			
3	20:9132	*See* FEMP–2394			
6	20:7475	*See* FEMP–2396			
CONF-941247–		(1994 Asia-Pacific microwave conference; Tokyo (Japan); 6-9 Dec 1994)			
1	20:8277	*See* SAND–94-2531C			
CONF-941249–		(Savings through sharing conference; Washington, DC (United States); 7 Dec 1994)			
1	20:7491	*See* WHC-SA–2731			
CONF-950104–		(American Society of Heating, Refrigerating and Air-Conditioning Engineers winter meeting and exhibition; Chicago, IL (United States); 28 Jan - 1 feb 1995)			
3	20:7981	*See* LBL–34638			
CONF-950110–		(12. symposium on space nuclear power and propulsion; Albuquerque, NM (United States); 8-12 Jan 1995)			
17	20:8077	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005896	MF-528
CONF-950116–		(1995 American Society of Mechanical Engineers (ASME) energy sources technology conference and exhibition; Houston, TX (United States); 29 Jan - 1 feb 1995)			
4	20:8049	*See* NREL/TP–463-7230			
CONF-950117–		(Workshop on semiconductor characterization; Gaithersburg, MD (United States); 30 Jan - 2 feb 1995)			
1	20:8222	*See* SAND–95-0108C			
CONF-950124–		(75. annual meeting of the American Meteorological Society: diamond anniversary; Dallas, TX (United States); 15-20 Jan 1995)			
3	20:8653	*See* UCRL-JC–116575			
CONF-950129–		(19. annual conference on advanced ceramics, materials and structures; Cocoa Beach, FL (United States); 9-12 Jan 1995)			
1	20:8130	*See* SAND–94-2056C			
CONF-950130–		(33. American Institute of Aeronautics and Astronautics (AIAA) aerospace sciences meeting; Reno, NV (United States); 9-12 Jan 1995)			
2	20:8256	*See* SAND–94-1403C			
3	20:8258	*See* SAND–94-3190C			
4	20:8255	*See* SAND–94-1402C			
CONF-950153–		(4. conference on polar meteorology and oceanography; Dallas, TX (United States); 15-20 Jan 1995)			
1	20:8546	*See* PNL-SA–24935			
CONF-950154–		(Multi chip module conference; Santa Cruz, CA (United States); 31 Jan - 2 feb 1995)			
1	20:8279	*See* SAND–94-2922C			
CONF-950216–		(Waste management '95; Tucson, AZ (United States); 26 Feb - 2 mar 1995)			
5	20:7429	*See* WSRC-MS–95-0012			
6	20:7426	*See* WSRC-MS–94-0453			
7	20:7430	*See* WSRC-MS–95-0013			
8	20:7440	*See* WSRC-TR–95-0014			
9	20:7432	*See* WSRC-MS–95-0028			

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
10	20:7431	*See* WSRC-MS–95-0025			
11	20:7428	*See* WSRC-MS–94-0608			
CONF-950226–		(SPIE '95: SPIE conference on optics, electro-optics, and laser application in science, engineering and medicine; San Jose, CA (United States); 5-10 Feb 1995)			
1	20:8276	*See* SAND–94-2206C			
3	20:7697	*See* WSRC-MS–94-0632			
CONF-950259–		(Portable by design conference; Santa Clara, CA (United States); 15-17 Feb 1995)			
1	20:7833	*See* SAND–94-2763C			
CONF-950261–		(Contribution for Halbach Festschrift; Berkeley, CA (United States); 3 Feb 1995)			
1	20:8312	*See* BNL–61053			
CONF-950304–		(Corrosion '95: National Association of Corrosion Engineers (NACE) international annual conference and corrosion show; Orlando, FL (United States); 26-31 Mar 1995)			
5	20:7296	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95003749	MF-702
CONF-950336–		(American Society of Mechanical Engineers/Japanese Society of Mechanical Engineers/Japan Solar Energy Society international solar energy conference; Maui, HI (United States); 19-24 Mar 1995)			
18	20:7599	*See* NREL/TP–471-7296			
CONF-950402–		(209. American Chemical Society national meeting; Anaheim, CA (United States); 2-7 Apr 1995)			
2	20:8194	*See* SAND–94-3183C			
3	20:8431	*See* BNL–61230			
CONF-9504100–		(5. multidisciplinary conference on sinkholes and the engineering and environmental impacts of Karst; Gatlinburg, TN (United States); 1-5 Apr 1995)			
2	20:7246	*See* SAND–94-3093C			
CONF-950439–		(SMS simulation multiconference: simulation as a critical technology; Phoenix, AZ (United States); 9-13 Apr 1995)			
1	20:7427	*See* WSRC-MS–94-0600			
CONF-950483–		(3. international symposium on in situ and on-site bioreclamation; San Diego, CA (United States); 24-27 Apr 1995)			
1	20:7488	*See* SAND–94-1718C			
CSNAS–					
0075.	20:8596	*See* CNIC–00798			
DOE-HDBK–					
1074-95	20:7470	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006851	MF-500
DOE/AL/65030–					
9413	20:7442	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006378	PC-702
DOE/BC–					
94/1	20:7195	OSTI; NTIS; GPO Dep.	E 1.99:	DE94000200	MF-122
95000129	20:8647	OSTI; NTIS; GPO Dep.	E 1.99:	DE95000129	MF-122
DOE/BC/14477–					
16	20:7189	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005327	MF-122
17	20:7190	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005328	MF-122
DOE/BC/14654–					
T6	20:7196	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005803	MF-122
T8	20:7197	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005805	MF-122
T9	20:7198	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005806	MF-122
DOE/BC/14662–					
15	20:7199	OSTI; NTIS; GPO Dep.	E 1.99:	DE95000121	MF-122
DOE/BC/14664–					
12	20:7200	OSTI; NTIS; GPO Dep.	E 1.99:	DE95000127	MF-122
DOE/BC/14831–					
12	20:7201	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005344	MF-122
DOE/BC/14856–					
1	20:7202	OSTI; NTIS; GPO Dep.	E 1.99:	DE95001703	MF-122
DOE/BC/14860–					
8	20:7203	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005332	MF-122
DOE/BC/14861–					
5	20:7204	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005333	MF-122

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
DOE/BC/14862–7	20:7205	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005338	MF-122
DOE/BC/14875–5	20:7206	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005326	MF-122
DOE/BC/14881–9	20:7207	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005346	MF-122
DOE/BC/14882–9	20:8180	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005340	MF-122
DOE/BC/14883–8	20:7208	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005370	MF-122
9	20:7209	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005371	MF-122
DOE/BC/14884–9	20:7210	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005358	MF-122
10	20:7211	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005359	MF-122
DOE/BC/14891–4	20:7212	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005339	MF-122
DOE/BC/14893–4	20:7191	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005357	MF-122
DOE/BC/14896–4	20:7192	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005334	MF-122
DOE/BC/14951–8	20:7213	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005330	MF-122
DOE/BC/14952–10	20:7214	OSTI; NTIS; GPO Dep.	E 1.99:	DE95000125	MF-122
DOE/BC/14954–8	20:7215	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005360	MF-122
DOE/BC/14958–T2	20:7216	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005322	MF-122
DOE/BC/14960–6	20:7217	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005367	MF-122
DOE/BC/14963–4	20:7218	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005368	MF-122
5	20:7219	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005369	MF-122
DOE/BC/14970–1	20:7193	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005315	MF-122
DOE/BC/14977–1	20:7220	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005318	MF-122
2	20:7221	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005319	MF-122
DOE/BC/14983–2	20:7222	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005341	MF-122
DOE/BC/14984–1	20:7223	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005314	MF-122
DOE/BC/14986–2	20:7224	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005349	MF-122
DOE/BC/14990–1	20:7225	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005355	MF-122
DOE/BP–1953	20:7574	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004891	MF-920
1958	20:8018	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004894	MF-900
2457	20:8019	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004888	MF-906
2458	20:7960	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004887	MF-920
2505	20:7579	*See* DOE/EA–0939			
DOE/BP/01385–2	20:7573	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004893	MF-920
DOE/BP/22493–8	20:7575	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004885	MF-920
DOE/BP/23720–21	20:7576	OSTI; NTIS; GPO Dep.	E 1.99:	DE95003115	MF-902
DOE/BP/25105–1	20:8523	OSTI; NTIS; GPO Dep.	E 1.99:	DE95003120	MF-902
DOE/BP/66088–1	20:7539	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005618	MF-1310
DOE/BP/91964–3	20:7577	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004889	MF-920
DOE/BP/97298–2	20:7578	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004884	MF-920
DOE/CE/15544–T9	20:8598	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004703	MF-1401

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
DOE/CE/15558–					
T3	20:8042	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004704	MF-1500
DOE/CE/15613–					
T3	20:8137	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006255	MF-1425
DOE/CE/21009–					
T1	20:7961	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005456	MF-1600
DOE/CE/23810–					
48	20:8432	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005451	MF-1330
48C	20:7962	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005666	MF-1425
DOE/CE/26592–					
2	20:8249	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004709	MF-1330
DOE/CE/26610–					
T1	20:8043	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005810	MF-1330
DOE/CE/90043–					
T1	20:7845	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004705	MF-1400
DOE/CH/10093–					
273	20:8044	OSTI; NTIS; GPO Dep.	E 1.99:	DE94000271	PC-1320
DOE/CR–					
0032	20:7869	OSTI; NTIS; GPO Dep.	E 1.99:	DE95007104	ND-900
DOE/DP–					
0130	20:7469	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006855	MF-707
DOE/EA–					
0575	20:7167	OSTI; NTIS; GPO Dep.	E 1.99:	DE95002669	MF-630
0931	20:8226	OSTI; NTIS; GPO Dep.	E 1.99:	DE95002675	MF-630
0939	20:7579	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004886	MF-902
0962	20:7824	OSTI; NTIS; GPO Dep.	E 1.99:	DE95002676	MF-630
DOE/ED–					
0006	20:7870	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006376	PC-900
DOE/EE–					
0025	20:7963	OSTI; NTIS; GPO Dep.	E 1.99:	DE95007021	PC-1600
DOE/EH–					
0445	20:8611	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006364	MF-600
0447	20:7852	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006150	MF-600
231-054/1294	20:7851	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005305	MF-600
95006312	20:7783	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006312	MF-600
DOE/EIA–					
0035(95/01)	20:7913	OSTI; NTIS; GPO; GPO Dep.	E 1.99:	DE95005791	MF-950
0226(95/01)	20:7905	OSTI; NTIS; GPO; GPO Dep.	E 1.99:	DE95005611	MF-950
0380(95/01)	20:7232	OSTI; NTIS; GPO; GPO Dep.	E 1.99:	DE95005610	MF-950
0437(93)/1	20:7906	OSTI; NTIS; GPO; GPO Dep.	E 1.99:	DE95005365	MF-950
0487(93)	20:7233	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005364	MF-950
0520(95/01)	20:7234	OSTI; NTIS; GPO; GPO Dep.	E 1.99:	DE95005790	MF-950
0538(94/95-14)	20:7235	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005366	MF-950
0538(94/95-15)	20:7885	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005670	MF-950
0540(93)	20:7907	OSTI; NTIS; GPO; GPO Dep.	E 1.99:	DE95005669	MF-950
0585(93)	20:8011	OSTI; NTIS; GPO; GPO Dep.	E 1.99:	DE95005445	MF-950
0586	20:7908	OSTI; NTIS; GPO; GPO Dep.	E 1.99:	DE95006183	MF-950
M059/A	20:7236	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006081	MF-950
M062/2	20:7249	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006079	MF-950
M069/A	20:7886	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006080	MF-950
DOE/ER–					
0591-Suppl.	20:8578	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006365	MF-408
0635	20:7871	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005656	MF-400
0636	20:8648	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005657	MF-403
0638	20:7909	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006366	MF-400
DOE/ER/03064–					
T2	20:8779	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004694	MF-414
T3	20:8780	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004695	MF-414
T4	20:8781	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004696	MF-414
T5	20:8782	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004697	MF-414

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
DOE/ER/13426–					
T4	20:8568	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005545	MF-408
DOE/ER/13520–					
T1	20:8959	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004446	MF-411
T2	20:8960	OSTI; INIS; NTIS; GPO Dep.	E 1.99:	DE95004447	MF-411
DOE/ER/13621–					
T1	20:8579	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005785	MF-408
T2	20:8580	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005741	MF-408
DOE/ER/13676–					
7	20:8020	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005668	MF-406
DOE/ER/14081–					
T3	20:8649	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004702	MF-403
DOE/ER/14217–					
2	20:7606	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004260	MF-403
DOE/ER/14227–					
3	20:8181	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004439	MF-401
DOE/ER/25052–					
4	20:9161	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005665	MF-405
DOE/ER/25199–					
T1	20:9162	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005495	MF-405
DOE/ER/40128–					
T10	20:8287	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004624	MF-414
T8	20:8285	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004622	MF-414
T9	20:8286	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004623	MF-414
DOE/ER/40150–					
281	20:8313	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005905	MF-414
DOE/ER/40246–					
9	20:8906	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004621	MF-413
DOE/ER/40291–					
22	20:8714	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005924	MF-414
23	20:8715	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005925	MF-414
24	20:8716	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005926	MF-414
25	20:8717	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005927	MF-414
26	20:8783	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005928	MF-414
DOE/ER/40354–					
5	20:8907	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004437	MF-413
DOE/ER/40561–					
164	20:8688	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004761	MF-412
172	20:8826	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004762	MF-413
173	20:8853	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004763	MF-413
174	20:8908	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004764	MF-413
DOE/ER/40736–					
T1	20:8784	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004376	MF-413
DOE/ER/40878–					
T1	20:8250	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004372	MF-406
DOE/ER/40879–					
T1	20:9163	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004374	MF-405
DOE/ER/40880–					
1	20:8754	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005110	MF-414
DOE/ER/40888–					
T1	20:8021	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004373	MF-406
DOE/ER/45201–					
T2	20:8069	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004450	MF-404
DOE/ER/45237–					
T3	20:8138	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004448	MF-411
DOE/ER/45427–					
5	20:8120	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005796	MF-404
DOE/ER/53198–					
253	20:9044	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95007016	PC-426; PC-427
254	20:9045	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95007017	PC-426; PC-427
DOE/ER/53212–					
255	20:9046	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95007018	PC-427
DOE/ER/60355–					
T3	20:8524	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005816	MF-403
DOE/ER/60490–					
T5	20:8569	OSTI; NTIS; GPO Dep.	E 1.99:	DE95002128	MF-402
T6	20:8570	OSTI; NTIS; GPO Dep.	E 1.99:	DE95002129	MF-402
DOE/ER/60617–					
6	20:8198	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005798	MF-408

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
7	20:8199	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005799	MF-408
8	20:8200	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005800	MF-408
DOE/ER/60656–					
7	20:8612	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95003789	MF-408
DOE/ER/60743–					
T1	20:8525	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005512	MF-402
T2	20:8526	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005513	MF-402
T3	20:8527	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005514	MF-402
DOE/ER/60934–					
T1	20:8528	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005455	MF-402
T2	20:8529	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005454	MF-402
DOE/ER/61032–					
T2	20:8586	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004449	MF-402
DOE/ER/61137–					
T3	20:8581	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005808	MF-408
DOE/ER/61364–					
3	20:8433	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006256	MF-402
DOE/ER/61400–					
T1	20:8582	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005812	MF-408
DOE/ER/61670–					
1	20:8583	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004445	MF-408
DOE/ER/75642–					
T2	20:8654	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005782	MF-400
DOE/ER/75671–					
T1	20:8221	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004699	MF-400
DOE/ER/79214–					
1	20:7766	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004440	MF-406
DOE/ET–					
0136	20:9128	OSTI; NTIS; GPO Dep.	E 1.99:	DE95002580	MF-900
DOE/ET/53088–					
670	20:8973	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004514	MF-427
685	20:8974	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004515	MF-427
DOE/EW/50625–					
T21	20:7853	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005786	MF-2010
DOE/FE/62803–					
T1	20:7628	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004516	MF-109
DOE/GO–					
10094-005	20:7607	OSTI; NTIS; GPO Dep.	E 1.99:	DE94011892	MF-1240
10094-037	20:7543	OSTI; NTIS; GPO Dep.	E 1.99:	DE95000257	MF-1403
10094-039	20:7544	OSTI; NTIS; GPO Dep.	E 1.99:	DE95000259	MF-1403
DOE/ID–					
10437(93)	20:8434	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005045	MF-2070
DOE/ID/12772–					
3	20:8022	OSTI; NTIS; GPO Dep.	E 1.99:	DE94017504	PC-1415
DOE/ID/12779–					
3	20:8139	OSTI; NTIS; GPO Dep.	E 1.99:	DE95002658	PC-1418
DOE/ID/12833–					
1	20:8023	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004212	PC-1400
DOE/ID/13001–					
1	20:8024	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004438	MF-1414; MF-1416
DOE/IE/10859–					
T4	20:7237	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004466	MF-900
DOE/IG–					
0364	20:9130	OSTI (Free of Charge)		TI95006187	PC-960
0365	20:9131	OSTI (Free of Charge)		TI95006619	PC-960
DOE/MC/22118–					
3865	20:7151	OSTI; NTIS; GPO Dep.	E 1.99:	DE94012289	PC-103
DOE/MC/26006–					
3824	20:7916	OSTI; NTIS; GPO Dep.	E 1.99:	DE94012258	PC-110
3960	20:7917	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006152	MF-110

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
DOE/MC/26288–3961	20:7152	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006092	MF-105
DOE/MC/26366–3962	20:7102	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006089	MF-113
DOE/MC/27205–3963	20:8045	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006147	MF-103
3964	20:7168	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006154	MF-103
DOE/MC/27362–3860	20:7169	OSTI; NTIS; GPO Dep.	E 1.99:	DE94012286	PC-102; PC-104
DOE/MC/27363–3870	20:7629	OSTI; NTIS; GPO Dep.	E 1.99:	DE95000042	MF-109
DOE/MC/27391–3943	20:7103	OSTI; NTIS; GPO Dep.	E 1.99:	DE95000038	MF-109
DOE/MC/28162–3951	20:7633	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005114	MF-113; MF-107
DOE/MC/28245–3922	20:8470	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006153	MF-2010
DOE/MC/29109–3977	20:8344	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006218	MF-2070
3978	20:8345	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006217	MF-2070
3979	20:8154	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006208	MF-2070
DOE/MC/29119–3881	20:8416	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95000006	PC-2010
DOE/MC/29246–3941	20:7104	OSTI; NTIS; GPO Dep.	E 1.99:	DE95000034	PC-106
3944	20:7105	OSTI; NTIS; GPO Dep.	E 1.99:	DE95000036	MF-106
DOE/MC/29444–3984	20:7106	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006221	MF-109
DOE/MC/30012–3980	20:7107	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006160	MF-106; MF-113
DOE/MC/30252–3945	20:7153	OSTI; NTIS; GPO Dep.	E 1.99:	DE95000035	MF-105
DOE/METC–94/1009	20:8266	OSTI; NTIS; GPO Dep.	E 1.99:	DE94012262	MF-104
DOE/METC/C–94/7150	20:7108	OSTI; NTIS; GPO Dep.	E 1.99:	DE95003385	MF-106; MF-109
DOE/MT/92008–9	20:7239	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005380	MF-122
DOE/MT/92009–9	20:7240	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005383	MF-122
DOE/MT/92018–8	20:7154	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005374	MF-105
DOE/MT/92019–T2	20:7143	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005193	MF-102
DOE/MT/92020–8	20:7228	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005313	MF-125
DOE/MT/93005–4	20:7109	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005382	MF-109
DOE/MT/93007–4	20:7226	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005378	MF-122
DOE/MT/94011–1	20:7257	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005306	MF-122
DOE/NASA–0329-2	20:8056	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004832	MF-1502
DOE/NV/10384–28	20:8471	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006257	MF-703
DOE/NV/10845–35	20:8472	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95003833	MF-703
42	20:8435	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005667	MF-702
49	20:8650	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006253	MF-703
50	20:8473	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005111	MF-703

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
T20	20:7443	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006254	MF-702
DOE/OR–					
01-1258-D2	20:7297	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004742	MF-2020
01-1290-D1	20:7471	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004745	MF-2070
01-1292-D2	20:7298	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005882	MF-2040
01-1311-D2	20:7299	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004740	MF-2020
1047-D2	20:7300	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004741	MF-2020
DOE/OR/21981–					
T4	20:7854	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004860	MF-607
T5	20:7855	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004861	MF-607
DOE/OR/22160–					
T14	20:7301	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004858	MF-2020
T15	20:7302	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004859	MF-2020
DOE/PC/79819–					
12	20:7110	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005204	MF-108
DOE/PC/89663–					
T14	20:7630	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005468	MF-113
DOE/PC/89774–					
T11	20:7170	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005557	MF-104
DOE/PC/89788–					
T15	20:7111	OSTI; NTIS; GPO Dep.	E 1.99:	DE95000355	PC-108
DOE/PC/89805–					
T9	20:7171	OSTI; NTIS; GPO Dep.	E 1.99:	DE95001934	PC-105
DOE/PC/89903–					
T16	20:7112	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004453	MF-113
T17	20:7113	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004454	MF-113
T18	20:7114	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004455	MF-113
DOE/PC/90042–					
T10	20:7563	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005185	MF-108
DOE/PC/90044–					
10	20:7564	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005303	MF-109
DOE/PC/90046–					
T10	20:7565	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005558	MF-108
T11	20:7566	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005559	MF-108
DOE/PC/90057–					
T10	20:7229	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005518	MF-108
T11	20:7230	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005519	MF-108
DOE/PC/90096–					
T7	20:7155	OSTI; NTIS; GPO Dep.	E 1.99:	DE94012353	MF-105
DOE/PC/90287–					
T15	20:7144	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006248	MF-113; MF-102
DOE/PC/90308–					
T2	20:7087	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005767	MF-102
DOE/PC/90314–					
T1	20:7088	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005503	MF-102
T2	20:7089	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005504	MF-102
T3	20:7090	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005505	MF-102
T4	20:7091	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005506	MF-102
T5	20:7092	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005507	MF-102
T6	20:7093	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005508	MF-102
T7	20:7094	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005509	MF-102
T8	20:7095	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005510	MF-102
T9	20:7166	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005511	MF-102
DOE/PC/90365–					
T16	20:7156	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005766	MF-105
DOE/PC/90548–					
T14	20:7157	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005522	MF-105
T15	20:7158	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005523	MF-105
DOE/PC/91027–					
1	20:7115	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005702	MF-108
2	20:7116	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005703	MF-108
3	20:7117	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005704	MF-108
4	20:7118	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005705	MF-108

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
5	20:7119	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005706	MF-108
6	20:7120	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005707	MF-108
7	20:7121	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005708	MF-108
8	20:7122	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005709	MF-108
DOE/PC/91029–					
T3	20:7123	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005521	MF-108
DOE/PC/91039–					
T11	20:7124	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005768	MF-108
DOE/PC/91050–					
T8-Vol.1	20:7125	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004256	PC-108
T8-Vol.4	20:7126	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004258	PC-108
T9	20:7127	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005560	MF-108
DOE/PC/91054–					
T12	20:7128	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005189	MF-108
DOE/PC/91055–					
T9	20:7129	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005176	MF-108
DOE/PC/91056–					
T7	20:7130	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005175	MF-108
DOE/PC/91161–					
T9	20:7172	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004313	MF-104
DOE/PC/91281–					
T12	20:7131	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005196	MF-108
DOE/PC/91288–					
T14	20:7132	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005770	MF-106
DOE/PC/91293–					
12	20:8436	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005202	MF-105
DOE/PC/91303–					
T13	20:7145	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005182	MF-102
DOE/PC/91308–					
12	20:7173	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005198	MF-104
DOE/PC/91311–					
T12	20:7133	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005184	MF-113
DOE/PC/91338–					
T8	20:7634	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005556	MF-105
DOE/PC/91344–					
T10	20:7635	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006207	MF-105
DOE/PC/92104–					
T7	20:7247	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005555	MF-125
DOE/PC/92111–					
T7	20:7248	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005191	MF-125
DOE/PC/92147–					
7	20:7134	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005205	MF-108
DOE/PC/92159–					
T9	20:7174	OSTI; NTIS; GPO Dep.	E 1.99:	DE95002579	PC-104
DOE/PC/92190–					
T6	20:7175	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006206	MF-105
DOE/PC/92206–					
T7	20:7096	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005769	MF-102
DOE/PC/92246–					
T6	20:7135	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005181	MF-102; MF-113
T7	20:7097	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005551	MF-105
DOE/PC/92251–					
T7	20:7146	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006240	MF-113
DOE/PC/92521–					
T193	20:7098	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005564	MF-102
DOE/PC/92527–					
T8	20:7136	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006205	MF-108
DOE/PC/92528–					
7	20:7176	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005203	MF-104
DOE/PC/92532–					
T9	20:7567	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005186	MF-108
DOE/PC/92542–					
T8	20:8078	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005187	MF-113
DOE/PC/92545–					
8	20:8182	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005206	MF-108
DOE/PC/92550–					
8	20:7137	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005201	MF-102
DOE/PC/93054–					
4	20:7138	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005173	MF-108

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
DOE/PC/93202–					
4	20:7147	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005200	MF-113
DOE/PC/93203–					
T4	20:7099	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006244	MF-102
DOE/PC/93213–					
T4	20:7568	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005188	MF-109
DOE/PC/93221–					
T4	20:7177	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005183	MF-103
DOE/PC/93223–					
T3	20:7148	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005174	MF-113
DOE/PC/93225–					
4	20:8140	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005199	MF-114
DOE/PC/93226–					
T4	20:7178	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005194	MF-113
DOE/PC/93256–					
T4	20:7159	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005562	MF-105
T5	20:7160	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005563	MF-105
DOE/PC/94116–					
T1	20:7100	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005554	MF-102; MF-104
T2	20:7101	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005763	MF-102; MF-104
DOE/PC/94207–					
T1	20:7139	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006242	MF-106
DOE/PC/94211–					
T1	20:7179	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006243	MF-104
DOE/PC/94214–					
T1	20:7149	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006241	MF-102; MF-113
DOE/PC/94227–					
T1	20:7856	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006246	MF-107
DOE/R5/51901–					
T4	20:8141	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005119	MF-1261
DOE/R6/99203–					
T8	20:8025	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005115	MF-1400
DOE/RL–					
91-50-Rev.1	20:7444	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006731	MF-2050
93-43	20:7303	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004867	MF-940
93-78	20:7304	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004866	MF-940
93-98	20:7305	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004868	MF-940
94-46	20:7472	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004949	MF-2050
94-54	20:7306	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004871	MF-940
DOE/S–					
0069-Vol.1	20:7872	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004882	MF-900
0069-Vol.2	20:7873	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004883	MF-900
DOE/SF/19090–					
T3	20:7652	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005458	MF-523
DOE/SR/18445–					
T1	20:7307	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005776	MF-2000
DOE/TP–					
0001	20:7874	OSTI; NTIS; GPO; GPO Dep.	E 1.99:	DE95004241	MF-900
DPW–					
55-16-39	20:7767	OSTI; NTIS; GPO Dep.	E 1.99:	DE95002378	MF-700
55-17-23	20:7705	OSTI; NTIS; GPO Dep.	E 1.99:	DE95002435	MF-700
55-4-9	20:7308	OSTI; NTIS; GPO Dep.	E 1.99:	DE95002498	MF-700
55-4-10	20:7309	OSTI; NTIS; GPO Dep.	E 1.99:	DE95002499	MF-700
55-4-40	20:7310	OSTI; NTIS; GPO Dep.	E 1.99:	DE95002436	MF-700
DTU-AEF-NT–					
11	20:7784	OSTI; NTIS; INIS		DE95612954	
12	20:7687	OSTI; NTIS; INIS		DE95615835	
DTU-LV-MEDD–					
264	20:7603	OSTI; NTIS		DE95737562	
267	20:7601	OSTI; NTIS		DE95737590	
ECON–					
307/94	20:7858	OSTI; NTIS		DE95737647	
39/93	20:7857	OSTI; NTIS		DE95737646	

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
EGD-CERCLA–					
002/0790	20:7859	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005351	MF-630
EGG-M–					
94185	20:7608	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005000	MF-1246
EGG-WM–					
11049	20:7311	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95002018	MF-2010
11467	20:7312	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95002019	MF-2000
EGG-WTD–					
11252-Vol.1	20:9189	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95002011	MF-2080
ENRESA–					
08/94	20:8474	OSTI; NTIS; INIS		DE95739356	
10/94	20:8475	OSTI; NTIS; INIS		DE95739385	
EPD-CTG–					
94-0037	20:8227	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004805	MF-721
ES/ER/TM–					
102/R1	20:7313	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004874	MF-2070
113	20:7474	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004739	MF-2000
123	20:7445	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004744	MF-2070
125	20:8641	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004880	MF-2000
126	20:8642	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004879	MF-2000
33/R1	20:7473	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004735	MF-2000
76	20:8639	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004877	MF-2000
85/R1	20:8640	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004732	MF-2070
96/R1	20:8476	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005996	MF-2000
ETDE-DE–					
1	20:8057	OSTI; NTIS (US Sales Only)		DE95738918	
2	20:7910	OSTI; NTIS (US Sales Only)		DE95737795	
3	20:7631	OSTI; NTIS (US Sales Only)		DE95738932	
4	20:8046	OSTI; NTIS (US Sales Only)		DE95738929	
5	20:7162	OSTI; NTIS (US Sales Only)		DE95738150	
6	20:7163	OSTI; NTIS (US Sales Only)		DE95738700	
7	20:7164	OSTI; NTIS (US Sales Only)		DE95738149	
10	20:7243	OSTI; NTIS (US Sales Only)		DE95738903	
11	20:7901	OSTI; NTIS (US Sales Only)		DE95738875	
12	20:7537	OSTI; NTIS (US Sales Only)		DE95738876	
ETDE/CH-mf–					
95743547	20:9032	OSTI; NTIS		DE95743547	
EUROSIM–					
94-10	20:7706	OSTI; NTIS; INIS		DE95612819	
FAAR–					
23/1993	20:8437	OSTI; NTIS		DE95737628	
FE-MIT–					
92111-8	20:7248	*See* DOE/PC/92111–T7			
FEI–					
2217	20:7699	OSTI; NTIS (US Sales Only); INIS		DE95612810	
2231	20:7691	OSTI; NTIS (US Sales Only); INIS		DE95612796	
2238	20:7700	OSTI; NTIS (US Sales Only); INIS		DE95612811	
2240	20:7701	OSTI; NTIS (US Sales Only); INIS		DE95612812	
2257	20:8961	OSTI; NTIS (US Sales Only); INIS		DE95614132	
2271	20:7679	OSTI; NTIS (US Sales Only); INIS		DE95612955	
2277	20:8854	OSTI; NTIS (US Sales Only); INIS		DE95613846	
2293	20:8346	OSTI; NTIS (US Sales Only); INIS		DE95613003	
2298	20:7688	OSTI; NTIS (US Sales Only); INIS		DE95612790	
FEMP–					
2394	20:9132	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004943	MF-2050
2396	20:7475	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004945	MF-2050

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
95004724	20:7476	OSTI; NTIS; INIS; GPO; GPO Dep.	E 1.99:	DE95004724	MF-900
FNAL/C–					
94/144-E	20:8785	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004852	MF-414
94/209-E	20:8786	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004850	MF-414
94/252-E	20:8787	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004793	MF-414
94/293-E	20:8788	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004581	MF-414
94/307	20:8347	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004854	MF-414
94/337-E	20:8827	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004855	MF-414
94/368-E	20:8828	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004853	MF-414
94/373	20:8689	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004238	MF-412
94/379-E	20:8348	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004848	MF-414
94/397	20:8690	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004849	MF-414
94/404-E	20:8789	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004851	MF-414
FOA-R–					
94-00022-1.2	20:7887	OSTI; NTIS		DE95737684	
FRCEA-TH–					
395	20:9097	OSTI; NTIS (US Sales Only); INIS		DE95614262	
396	20:9047	OSTI; NTIS (US Sales Only); INIS		DE95614229	
407	20:7707	OSTI; NTIS (US Sales Only); INIS		DE95613318	
409	20:8228	OSTI; NTIS (US Sales Only); INIS		DE95612718	
411	20:8251	OSTI; NTIS (US Sales Only); INIS		DE95612667	
412	20:7264	OSTI; NTIS (US Sales Only); INIS		DE95612016	
424	20:9033	OSTI; NTIS (US Sales Only); INIS		DE95614467	
GA-A–					
21834	20:9048	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004962	MF-420
21872	20:9049	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004870	MF-426
GANIL-T–					
94-01	20:8349	OSTI; NTIS (US Sales Only); INIS		DE95613070	
94-02	20:8829	OSTI; NTIS (US Sales Only); INIS		DE95613797	
GKSS–					
93/E/78	20:8079	OSTI; NTIS (US Sales Only)		DE95738841	
94/E/10	20:8530	OSTI; NTIS (US Sales Only); INIS		DE95738696	
94/E/13	20:8448	OSTI; NTIS (US Sales Only)		DE95738574	
94/E/14	20:7244	OSTI; NTIS (US Sales Only)		DE95738575	
94/E/31	20:7546	OSTI; NTIS (US Sales Only)		DE95738116	
94/E/32	20:8080	OSTI; NTIS (US Sales Only)		DE95738115	
94/E/7	20:8447	OSTI; NTIS (US Sales Only)		DE95738720	
GRI–					
93/0091	20:7252	OSTI; NTIS; Gas Research Institute, 8600 West Bryn Mawr Ave., Chicago, IL 60631; GPO Dep.	E 1.99:	DE95004421	
93/0229	20:7253	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005047	
94/0035	20:7254	OSTI; Gas Research Institute, 8600 West Bryn Mawr Ave., Chicago, IL 60631 (United States)		TI95005738	
GSF–					
10/94	20:7314	OSTI; NTIS (US Sales Only); INIS		DE95738784	
HEP-TH–					
9408137	20:8735	*See* SLAC-PUB–6640			
HEPPH–					
9410331.	20:8831	*See* IC–94/303			
HLW-TEC–					
940020	20:7315	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004828	MF-721
HMI-B–					
516	20:7785	OSTI; NTIS (US Sales Only); INIS		DE95738773	
IA–					
1486	20:9133	OSTI; NTIS (US Sales Only); INIS		DE95614584	
IAE–					
0121.	20:8152	*See* CNIC–00766			
0123.	20:7292	*See* CNIC–00782			
0125.	20:8343	*See* CNIC–00786			
IAEA-CN–					
60/A5-II-6-2	20:9089	*See* PPPL-CFP–3185			
60/D-3-III-2	20:9081	*See* PPPL–3033			
IAEA-R–					
6328-F	20:8589	OSTI; NTIS (US Sales Only); INIS		DE95615746	
6773-F	20:7262	OSTI; NTIS (US Sales Only); INIS		DE95615481	
IAEA-TECDOC–					
721	20:8531	OSTI; NTIS (US Sales Only); INIS		DE95615467	
762	20:7709	OSTI; NTIS (US Sales Only); INIS		DE95615882	
765	20:7265	OSTI; NTIS (US Sales Only); INIS		DE95612017	
766	20:7702	OSTI; NTIS (US Sales Only); INIS		DE95614900	

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
769	20:7739	OSTI; NTIS (US Sales Only); INIS		DE95615814	
770	20:9134	OSTI; NTIS (US Sales Only); INIS		DE95613348	
773	20:7653	OSTI; NTIS (US Sales Only); INIS		DE95615911	
IAEA-WATRP–					
94.	20:7317	*See* INIS-mf–14432			
IASSNS-HEP–					
94/70	20:8752	*See* UM-P–94/96			
IC–					
93/366	20:8666	OSTI; NTIS (US Sales Only); INIS		DE95613371	
94/188	20:8667	OSTI; NTIS (US Sales Only); INIS		DE95613372	
94/221	20:8955	OSTI; NTIS (US Sales Only); INIS		DE95614122	
94/225	20:8790	OSTI; NTIS (US Sales Only); INIS		DE95613726	
94/238	20:8489	OSTI; NTIS (US Sales Only); INIS		DE95612415	
94/240	20:8718	OSTI; NTIS (US Sales Only); INIS		DE95613459	
94/243	20:8956	OSTI; NTIS (US Sales Only); INIS		DE95614123	
94/253	20:8975	OSTI; NTIS (US Sales Only); INIS		DE95614307	
94/261	20:8755	OSTI; NTIS (US Sales Only); INIS		DE95613654	
94/266	20:8668	OSTI; NTIS (US Sales Only); INIS		DE95613373	
94/268	20:8669	OSTI; NTIS (US Sales Only); INIS		DE95613374	
94/272	20:9019	OSTI; NTIS (US Sales Only); INIS		DE95614444	
94/273	20:8693	OSTI; NTIS (US Sales Only); INIS		DE95613442	
94/277	20:8756	OSTI; NTIS (US Sales Only); INIS		DE95613595	
94/279	20:8670	OSTI; NTIS (US Sales Only); INIS		DE95613375	
94/280	20:8830	OSTI; NTIS (US Sales Only); INIS		DE95613771	
94/281	20:8671	OSTI; NTIS (US Sales Only); INIS		DE95613376	
94/283	20:8490	OSTI; NTIS (US Sales Only); INIS		DE95612416	
94/284	20:8694	OSTI; NTIS (US Sales Only); INIS		DE95613443	
94/285	20:8757	OSTI; NTIS (US Sales Only); INIS		DE95613589	
94/286	20:8976	OSTI; NTIS (US Sales Only); INIS		DE95614308	
94/288	20:9020	OSTI; NTIS (US Sales Only); INIS		DE95614445	
94/289	20:8719	OSTI; NTIS (US Sales Only); INIS		DE95613584	
94/290	20:8720	OSTI; NTIS (US Sales Only); INIS		DE95613460	
94/291	20:9034	OSTI; NTIS (US Sales Only); INIS		DE95614468	
94/292	20:9021	OSTI; NTIS (US Sales Only); INIS		DE95614446	
94/294	20:9022	OSTI; NTIS (US Sales Only); INIS		DE95614447	
94/295	20:8952	OSTI; NTIS (US Sales Only); INIS		DE95614107	
94/296	20:8695	OSTI; NTIS (US Sales Only); INIS		DE95613444	
94/297	20:9035	OSTI; NTIS (US Sales Only); INIS		DE95614469	
94/298	20:8696	OSTI; NTIS (US Sales Only); INIS		DE95613445	
94/300	20:8672	OSTI; NTIS (US Sales Only); INIS		DE95613377	
94/301	20:8697	OSTI; NTIS (US Sales Only); INIS		DE95613446	
94/302	20:8758	OSTI; NTIS (US Sales Only); INIS		DE95613655	
94/303	20:8831	OSTI; NTIS (US Sales Only); INIS		DE95613798	
94/304	20:9039	OSTI; NTIS (US Sales Only); INIS		DE95614482	
94/305	20:8721	OSTI; NTIS (US Sales Only); INIS		DE95613467	
94/306	20:8759	OSTI; NTIS (US Sales Only); INIS		DE95613596	
94/307	20:8722	OSTI; NTIS (US Sales Only); INIS		DE95613468	
94/313	20:8911	OSTI; NTIS (US Sales Only); INIS		DE95614044	
94/314	20:8673	OSTI; NTIS (US Sales Only); INIS		DE95613378	
94/315	20:8977	OSTI; NTIS (US Sales Only); INIS		DE95614309	
94/316	20:8978	OSTI; NTIS (US Sales Only); INIS		DE95614310	
94/318	20:8674	OSTI; NTIS (US Sales Only); INIS		DE95613379	
94/320	20:8698	OSTI; NTIS (US Sales Only); INIS		DE95613447	
94/322	20:8723	OSTI; NTIS (US Sales Only); INIS		DE95613469	
94/323	20:8760	OSTI; NTIS (US Sales Only); INIS		DE95613656	
94/324	20:8675	OSTI; NTIS (US Sales Only); INIS		DE95613380	
94/326	20:8979	OSTI; NTIS (US Sales Only); INIS		DE95614311	
94/327	20:8791	OSTI; NTIS (US Sales Only); INIS		DE95613688	
94/329	20:9023	OSTI; NTIS (US Sales Only); INIS		DE95614448	
94/330	20:8699	OSTI; NTIS (US Sales Only); INIS		DE95613448	
94/331	20:8700	OSTI; NTIS (US Sales Only); INIS		DE95613449	
94/332	20:8676	OSTI; NTIS (US Sales Only); INIS		DE95613381	
94/333	20:8792	OSTI; NTIS (US Sales Only); INIS		DE95613765	
94/334	20:9040	OSTI; NTIS (US Sales Only); INIS		DE95614483	
94/336	20:8724	OSTI; NTIS (US Sales Only); INIS		DE95613470	
94/337	20:8994	OSTI; NTIS (US Sales Only); INIS		DE95614370	
94/338	20:8725	OSTI; NTIS (US Sales Only); INIS		DE95613585	
94/340	20:9024	OSTI; NTIS (US Sales Only); INIS		DE95614449	
94/341	20:8677	OSTI; NTIS (US Sales Only); INIS		DE95613382	
94/342	20:8995	OSTI; NTIS (US Sales Only); INIS		DE95614371	
94/344	20:8678	OSTI; NTIS (US Sales Only); INIS		DE95613383	

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
IFP–					
41456	20:7902	OSTI; NTIS (US Sales Only); INIS		DE95612595	
IFSR–					
670	20:8973	*See* DOE/ET/53088–670			
685	20:8974	*See* DOE/ET/53088–685			
IFVE–					
93-100.	20:8832	*See* IHEP–93-100			
IFVE-OEA–					
92-109	20:8367	OSTI; NTIS (US Sales Only); INIS		DE95613071	
IFVE-OEF–					
91-127	20:8368	OSTI; NTIS (US Sales Only); INIS		DE95613072	
IFVE-OEIUNK–					
92-60	20:8369	OSTI; NTIS (US Sales Only); INIS		DE95613151	
IFVE-OMVT–					
92-123	20:8314	OSTI; NTIS (US Sales Only); INIS		DE95612752	
92-44	20:9164	OSTI; NTIS (US Sales Only); INIS		DE95613202	
IHEP–					
93-100	20:8832	OSTI; NTIS (US Sales Only); INIS		DE95613774	
93-117	20:8370	OSTI; NTIS (US Sales Only); INIS		DE95613073	
IKE-5–					
240	20:7604	OSTI; NTIS (US Sales Only)		DE95738270	
INDC(CPR)–					
028/L.	20:8881	*See* CNIC–00690			
030/L.	20:8897	*See* CNIC–00750			
INDC(GER)–					
039/LN	20:9138	*See* Juel–2950			
INIS-RU–					
378	20:8495	OSTI; NTIS (US Sales Only); INIS		DE95615485	
INIS-mf–					
13801	20:8214	OSTI; NTIS (US Sales Only); INIS		DE95611878	
14415	20:8491	OSTI; NTIS (US Sales Only); INIS		DE95612386	
14416	20:8452	OSTI; NTIS (US Sales Only); INIS		DE95612434	
14417	20:7654	OSTI; NTIS (US Sales Only); INIS		DE95615912	
14429	20:7514	OSTI; NTIS (US Sales Only); INIS		DE95616224	
14431	20:7316	OSTI; NTIS (US Sales Only); INIS		DE95613230	
14432	20:7317	OSTI; NTIS (US Sales Only); INIS		DE95613231	
14433	20:7882	OSTI; NTIS (US Sales Only); INIS		DE95613296	
14434	20:7643	OSTI; NTIS (US Sales Only); INIS		DE95612832	
14435	20:9165	OSTI; NTIS (US Sales Only); INIS		DE95613232	
14436	20:7446	OSTI; NTIS (US Sales Only); INIS		DE95612417	
14437	20:9135	OSTI; NTIS (US Sales Only); INIS		DE95616238	
14437-Vol.1	20:7689	OSTI; NTIS (US Sales Only); INIS		DE95615836	
14437-Vol.2	20:9136	OSTI; NTIS (US Sales Only); INIS		DE95616239	
14437-Vol.3	20:7768	OSTI; NTIS (US Sales Only); INIS		DE95615954	
14437-Vol.4-Pt.1	20:7769	OSTI; NTIS (US Sales Only); INIS		DE95615955	
14437-Vol.4-Pt.3	20:7770	OSTI; NTIS (US Sales Only); INIS		DE95615956	
14440	20:8655	OSTI; NTIS (US Sales Only); INIS		DE95611717	
14446	20:9198	OSTI; NTIS (US Sales Only); INIS		DE95616225	
14447	20:8614	OSTI; NTIS (US Sales Only); INIS		DE95615559	
14448	20:9052	OSTI; NTIS (US Sales Only); INIS		DE95616231	
14449	20:8217	OSTI; NTIS (US Sales Only); INIS		DE95614822	
14450	20:8165	OSTI; NTIS (US Sales Only); INIS		DE95614585	
14451	20:8615	OSTI; NTIS (US Sales Only); INIS		DE95615563	
14452	20:8317	OSTI; NTIS (US Sales Only); INIS		DE95615824	
14453	20:9053	OSTI; NTIS (US Sales Only); INIS		DE95616538	
14454	20:8616	OSTI; NTIS (US Sales Only); INIS		DE95615566	
15048	20:8600	OSTI; NTIS (US Sales Only); INIS		DE95738866	
15049	20:8601	OSTI; NTIS (US Sales Only); INIS		DE95738865	
15060	20:8869	OSTI; NTIS (US Sales Only); INIS		DE95738901	
15077	20:7187	OSTI; NTIS (US Sales Only); INIS		DE95738952	
15079	20:7787	OSTI; NTIS (US Sales Only); INIS		DE95738688	
15080	20:7165	OSTI; NTIS (US Sales Only); INIS		DE95738585	
15083	20:7241	OSTI; NTIS (US Sales Only); INIS		DE95733338	
15086	20:8540	OSTI; NTIS (US Sales Only); INIS		DE95738942	
15087	20:9103	OSTI; NTIS (US Sales Only); INIS		DE95738839	
INRNE-Th–					
02/94.	20:8719	*See* IC–94/289			
INS–					
1050	20:8970	OSTI; NTIS; INIS		DE95737228	
IPP–					
6/322	20:9054	OSTI; NTIS (US Sales Only); INIS		DE95738334	

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
ITER-TN-BL–					
5-0-3	20:9104	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004667	MF-424
ITER/US–					
94/PH-07-14	20:9082	*See* PPPL–3034			
IVL-B–					
1167	20:8541	OSTI; NTIS		DE95737680	
1171	20:8455	OSTI; NTIS		DE95737681	
IYaF–					
93-115.	20:8848	*See* BUDKERINP–93-115			
93-44	20:9055	OSTI; NTIS (US Sales Only); INIS		DE95614171	
93-49	20:8685	OSTI; NTIS (US Sales Only); INIS		DE95613433	
93-64.	20:8966	*See* BUDKERINP–93-64			
93-93.	20:8713	*See* BUDKERINP–93-93			
93-94.	20:8660	*See* BUDKERINP–93-94			
93-95.	20:8847	*See* BUDKERINP–93-95			
93-96.	20:9041	*See* BUDKERINP–93-96			
93-97	20:9056	OSTI; NTIS (US Sales Only); INIS		DE95614201	
93-98	20:9057	OSTI; NTIS (US Sales Only); INIS		DE95614202	
94-1.	20:9042	*See* BUDKERINP–94-1			
94-33	20:9058	OSTI; NTIS (US Sales Only); INIS		DE95614187	
94-35	20:9059	OSTI; NTIS (US Sales Only); INIS		DE95614177	
94-36	20:9060	OSTI; NTIS (US Sales Only); INIS		DE95614178	
94-48	20:9061	OSTI; NTIS (US Sales Only); INIS		DE95614203	
94-49	20:9062	OSTI; NTIS (US Sales Only); INIS		DE95614204	
94-50	20:9063	OSTI; NTIS (US Sales Only); INIS		DE95614205	
94-51	20:9064	OSTI; NTIS (US Sales Only); INIS		DE95614206	
94-53.	20:8687	*See* BUDKERINP–94-53			
94-56.	20:8953	*See* BUDKERINP–94-56			
94-63	20:9065	OSTI; NTIS (US Sales Only); INIS		DE95614172	
94-66	20:9066	OSTI; NTIS (US Sales Only); INIS		DE95614207	
94-67	20:9067	OSTI; NTIS (US Sales Only); INIS		DE95614179	
JINR–					
3-66-94	20:8375	OSTI; NTIS (US Sales Only); INIS		DE95615980	
4-61-93	20:8916	OSTI; NTIS (US Sales Only); INIS		DE95616411	
5-62-93	20:7685	OSTI; NTIS (US Sales Only); INIS		DE95615834	
6-63-93	20:8860	OSTI; NTIS (US Sales Only); INIS		DE95616386	
94-62	20:9137	OSTI; NTIS (US Sales Only); INIS		DE95613349	
JINR-D–					
1-94-278	20:8796	OSTI; NTIS (US Sales Only); INIS		DE95613711	
15-93-80	20:8288	OSTI; NTIS (US Sales Only); INIS		DE95611718	
2-94-244	20:8656	OSTI; NTIS (US Sales Only); INIS		DE95613366	
JINR-E–					
1-94-201	20:8924	OSTI; NTIS (US Sales Only); INIS		DE95613992	
1-94-228	20:8925	OSTI; NTIS (US Sales Only); INIS		DE95613981	
1-94-241	20:8926	OSTI; NTIS (US Sales Only); INIS		DE95614022	
1-94-279	20:8927	OSTI; NTIS (US Sales Only); INIS		DE95614023	
1-94-294	20:8797	OSTI; NTIS (US Sales Only); INIS		DE95613727	
1-94-295	20:8874	OSTI; NTIS (US Sales Only); INIS		DE95613945	
1-94-296	20:8875	OSTI; NTIS (US Sales Only); INIS		DE95613946	
1-94-311	20:8928	OSTI; NTIS (US Sales Only); INIS		DE95614024	
13-94-214	20:8377	OSTI; NTIS (US Sales Only); INIS		DE95613074	
13-94-247	20:8378	OSTI; NTIS (US Sales Only); INIS		DE95613075	
13-94-257	20:8947	OSTI; NTIS (US Sales Only); INIS		DE95614094	
13-94-283	20:8379	OSTI; NTIS (US Sales Only); INIS		DE95613004	
13-94-284	20:8380	OSTI; NTIS (US Sales Only); INIS		DE95613005	
14-94-266	20:9009	OSTI; NTIS (US Sales Only); INIS		DE95614372	
2-94-200	20:8762	OSTI; NTIS (US Sales Only); INIS		DE95613627	
2-94-221	20:8798	OSTI; NTIS (US Sales Only); INIS		DE95613689	
2-94-231	20:8763	OSTI; NTIS (US Sales Only); INIS		DE95613628	
2-94-246	20:8657	OSTI; NTIS (US Sales Only); INIS		DE95613367	
2-94-248	20:8764	OSTI; NTIS (US Sales Only); INIS		DE95613629	
2-94-249	20:8679	OSTI; NTIS (US Sales Only); INIS		DE95613384	
2-94-253	20:8765	OSTI; NTIS (US Sales Only); INIS		DE95613597	
2-94-254	20:8799	OSTI; NTIS (US Sales Only); INIS		DE95613760	
2-94-258	20:8730	OSTI; NTIS (US Sales Only); INIS		DE95613461	
2-94-262	20:8800	OSTI; NTIS (US Sales Only); INIS		DE95613728	
2-94-263	20:8731	OSTI; NTIS (US Sales Only); INIS		DE95613471	
2-94-293	20:8732	OSTI; NTIS (US Sales Only); INIS		DE95613462	
2-94-297	20:8733	OSTI; NTIS (US Sales Only); INIS		DE95613463	
2-94-303	20:8766	OSTI; NTIS (US Sales Only); INIS		DE95613590	
2-94-307	20:8835	OSTI; NTIS (US Sales Only); INIS		DE95613782	

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
2-94-372	20:8767	OSTI; NTIS (US Sales Only); INIS		DE95613630	
3-94-227	20:7521	OSTI; NTIS (US Sales Only); INIS		DE95612942	
3-94-291	20:8987	OSTI; NTIS (US Sales Only); INIS		DE95614351	
4-94-234	20:8801	OSTI; NTIS (US Sales Only); INIS		DE95613690	
4-94-275	20:8861	OSTI; NTIS (US Sales Only); INIS		DE95613898	
4-94-308	20:8876	OSTI; NTIS (US Sales Only); INIS		DE95613947	
4-94-314	20:8877	OSTI; NTIS (US Sales Only); INIS		DE95613948	
5-94-259	20:8680	OSTI; NTIS (US Sales Only); INIS		DE95613385	
6-94-252	20:8862	OSTI; NTIS (US Sales Only); INIS		DE95613847	
6-94-271	20:8863	OSTI; NTIS (US Sales Only); INIS		DE95613848	
7-94-245	20:8929	OSTI; NTIS (US Sales Only); INIS		DE95613969	
7-94-286	20:8930	OSTI; NTIS (US Sales Only); INIS		DE95614045	
7-94-315	20:8931	OSTI; NTIS (US Sales Only); INIS		DE95614046	
9-94-236	20:8322	OSTI; NTIS (US Sales Only); INIS		DE95612760	
9-94-237	20:9105	OSTI; NTIS (US Sales Only); INIS		DE95614252	
9-94-255	20:8323	OSTI; NTIS (US Sales Only); INIS		DE95612753	
JINR-R–					
1-94-239	20:8381	OSTI; NTIS (US Sales Only); INIS		DE95613006	
1-94-240	20:8932	OSTI; NTIS (US Sales Only); INIS		DE95614025	
1-94-260	20:8933	OSTI; NTIS (US Sales Only); INIS		DE95613993	
1-94-274	20:8934	OSTI; NTIS (US Sales Only); INIS		DE95614026	
1-94-285	20:8935	OSTI; NTIS (US Sales Only); INIS		DE95614047	
1-94-289	20:8936	OSTI; NTIS (US Sales Only); INIS		DE95613994	
1-94-298	20:9010	OSTI; NTIS (US Sales Only); INIS		DE95614373	
10-94-300	20:9166	OSTI; NTIS (US Sales Only); INIS		DE95613324	
13-94-213	20:8324	OSTI; NTIS (US Sales Only); INIS		DE95612745	
13-94-267	20:8383	OSTI; NTIS (US Sales Only); INIS		DE95613007	
13-94-276	20:8384	OSTI; NTIS (US Sales Only); INIS		DE95613008	
13-94-277	20:8385	OSTI; NTIS (US Sales Only); INIS		DE95613009	
13-94-305	20:8386	OSTI; NTIS (US Sales Only); INIS		DE95613076	
13-94-309	20:8387	OSTI; NTIS (US Sales Only); INIS		DE95613077	
2-94-222	20:8658	OSTI; NTIS (US Sales Only); INIS		DE95613368	
2-94-223	20:8659	OSTI; NTIS (US Sales Only); INIS		DE95613369	
2-94-243	20:8836	OSTI; NTIS (US Sales Only); INIS		DE95613783	
4-94-229	20:8864	OSTI; NTIS (US Sales Only); INIS		DE95613849	
4-94-280	20:8802	OSTI; NTIS (US Sales Only); INIS		DE95613766	
6-94-265	20:8865	OSTI; NTIS (US Sales Only); INIS		DE95613850	
6-94-272	20:8382	OSTI; NTIS (US Sales Only); INIS		DE95613010	
9-94-261	20:8280	OSTI; NTIS (US Sales Only); INIS		DE95612720	
Juel–					
2834	20:7319	OSTI; NTIS (US Sales Only); INIS		DE95738857	
2855	20:7597	OSTI; NTIS (US Sales Only)		DE95738824	
2889	20:7753	OSTI; NTIS (US Sales Only); INIS		DE95738787	
2921	20:8542	OSTI; NTIS (US Sales Only); INIS		DE95738699	
2925	20:8496	OSTI; NTIS (US Sales Only); INIS		DE95738044	
2940	20:8866	OSTI; NTIS (US Sales Only); INIS		DE95738042	
2950	20:9138	OSTI; NTIS (US Sales Only); INIS		DE95738329	
KAERI/RR–					
1142/92	20:7515	OSTI; NTIS; INIS		DE95612651	
1178/92	20:9191	OSTI; NTIS; INIS		DE95613312	
1192/92	20:7748	OSTI; NTIS; INIS		DE95612820	
1195/92	20:8617	OSTI; NTIS; INIS		DE95612567	
1197/92	20:9139	OSTI; NTIS; INIS		DE95613350	
1203/92	20:9140	OSTI; NTIS; INIS		DE95613351	
1204/92	20:7883	OSTI; NTIS; INIS		DE95613277	
1205/92	20:9167	OSTI; NTIS; INIS		DE95613325	
1206/92	20:8252	OSTI; NTIS; INIS		DE95612668	
1213/92	20:8293	OSTI; NTIS; INIS		DE95612722	
1221/92	20:8618	OSTI; NTIS; INIS		DE95612568	
1222/93	20:7655	OSTI; NTIS; INIS		DE95612848	
1224/93	20:7656	OSTI; NTIS; INIS		DE95612849	
1227/92	20:8602	OSTI; NTIS; INIS		DE95612538	
1228/92	20:7677	OSTI; NTIS; INIS		DE95612931	
1231/92	20:8169	OSTI; NTIS; INIS		DE95611775	
1234/92	20:8702	OSTI; NTIS; INIS		DE95613450	
1236/92	20:8230	OSTI; NTIS; INIS		DE95612681	
1239/92	20:7657	OSTI; NTIS; INIS		DE95612850	
1240/92	20:7658	OSTI; NTIS; INIS		DE95612851	
1241/93	20:8170	OSTI; NTIS; INIS		DE95611776	
1247/93	20:7704	OSTI; NTIS; INIS		DE95612813	
1248/93	20:7516	OSTI; NTIS; INIS		DE95612654	

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
1251/93	20:8603	OSTI; NTIS; INIS		DE95612529	
1252/93	20:8604	OSTI; NTIS; INIS		DE95615625	
1253/93	20:7754	OSTI; NTIS; INIS		DE95612549	
1255/93	20:8262	OSTI; NTIS; INIS		DE95612782	
1256/93	20:8231	OSTI; NTIS; INIS		DE95612682	
1257/93	20:8388	OSTI; NTIS; INIS		DE95613152	
1259/93	20:7517	OSTI; NTIS; INIS		DE95612652	
1261/93	20:8389	OSTI; NTIS; INIS		DE95613153	
1262/93	20:9199	OSTI; NTIS; INIS		DE95613301	
1263/93	20:7749	OSTI; NTIS; INIS		DE95612852	
1264/93	20:8171	OSTI; NTIS; INIS		DE95611777	
1265/93	20:7690	OSTI; NTIS; INIS		DE95612791	
1266/93	20:7659	OSTI; NTIS; INIS		DE95612853	
1267/93	20:7692	OSTI; NTIS; INIS		DE95612797	
1268/93	20:7509	OSTI; NTIS; INIS		DE95613319	
1269/93	20:9192	OSTI; NTIS; INIS		DE95613311	
1270/93	20:7660	OSTI; NTIS; INIS		DE95612854	
1271/94	20:8232	OSTI; NTIS; INIS		DE95612683	
1272/93	20:8263	OSTI; NTIS; INIS		DE95612783	
1282/93	20:8325	OSTI; NTIS; INIS		DE95612754	
1283/93	20:7693	OSTI; NTIS; INIS		DE95612798	
1284/93	20:7860	OSTI; NTIS; INIS		DE95613260	
1286/93	20:7771	OSTI; NTIS; INIS		DE95612943	
1287/93	20:9168	OSTI; NTIS; INIS		DE95613321	
1288/93	20:9141	OSTI; NTIS; INIS		DE95613352	
1289/93	20:8390	OSTI; NTIS; INIS		DE95613011	
1290/93	20:9011	OSTI; NTIS; INIS		DE95614374	
1291/93	20:9142	OSTI; NTIS; INIS		DE95613353	
1292/93	20:7522	OSTI; NTIS; INIS		DE95612664	
1293/93	20:7694	OSTI; NTIS; INIS		DE95612799	
1295/93	20:7661	OSTI; NTIS; INIS		DE95612855	
1296/93	20:7662	OSTI; NTIS; INIS		DE95612856	
1298/93	20:9143	OSTI; NTIS; INIS		DE95613354	
1299/93	20:7695	OSTI; NTIS; INIS		DE95612684	
1300/93	20:9144	OSTI; NTIS; INIS		DE95613355	
1303/93	20:7663	OSTI; NTIS; INIS		DE95612857	
1307/93	20:7696	OSTI; NTIS; INIS		DE95612800	
1308/93	20:8619	OSTI; NTIS; INIS		DE95612569	
1310/94	20:7755	OSTI; NTIS; INIS		DE95612553	
1311/93	20:7668	OSTI; NTIS; INIS		DE95612923	
1312/94	20:8233	OSTI; NTIS; INIS		DE95612685	
1313/93	20:9169	OSTI; NTIS; INIS		DE95613326	
1314/93	20:7664	OSTI; NTIS; INIS		DE95612858	
1315/93	20:8620	OSTI; NTIS; INIS		DE95612570	
1316/93	20:7665	OSTI; NTIS; INIS		DE95612859	
1317/93	20:7669	OSTI; NTIS; INIS		DE95612924	
1318/93	20:8590	OSTI; NTIS; INIS		DE95612629	
1319/94	20:7518	OSTI; NTIS; INIS		DE95612653	
1320/94	20:8621	OSTI; NTIS; INIS		DE95612558	
1321/93	20:8605	OSTI; NTIS; INIS		DE95612539	
1322/94	20:8188	OSTI; NTIS; INIS		DE95611876	
1323/93	20:7686	OSTI; NTIS; INIS		DE95612787	
1324/94	20:8622	OSTI; NTIS; INIS		DE95612521	
1325/93	20:7320	OSTI; NTIS; INIS		DE95613236	
1326/93	20:7670	OSTI; NTIS; INIS		DE95612925	
1327/94	20:9038	OSTI; NTIS; INIS		DE95614478	
1328/93	20:8623	OSTI; NTIS; INIS		DE95612559	
1329/94	20:8988	OSTI; NTIS; INIS		DE95614352	
1330/93	20:9170	OSTI; NTIS; INIS		DE95613322	
1331/93	20:7756	OSTI; NTIS; INIS		DE95613327	
1332/93	20:7671	OSTI; NTIS; INIS		DE95612926	
1333/93	20:9171	OSTI; NTIS; INIS		DE95613328	
1335/93	20:9172	OSTI; NTIS; INIS		DE95613329	
1336/93	20:8264	OSTI; NTIS; INIS		DE95612784	
1337/93	20:8234	OSTI; NTIS; INIS		DE95612686	
1338/93	20:7750	OSTI; NTIS; INIS		DE95612821	
1339/93	20:9145	OSTI; NTIS; INIS		DE95613356	
1340/93	20:8336	OSTI; NTIS; INIS		DE95612956	
1341/93	20:8337	OSTI; NTIS; INIS		DE95612957	
1343/93	20:8099	OSTI; NTIS; INIS		DE95612019	
1344/93	20:7672	OSTI; NTIS; INIS		DE95612927	

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
1345/93	20:7683	OSTI; NTIS; INIS		DE95612928	
1346/93	20:8100	OSTI; NTIS; INIS		DE95612020	
1348/93	20:7510	OSTI; NTIS; INIS		DE95613320	
1349/93	20:8391	OSTI; NTIS; INIS		DE95613154	
1350/93	20:8235	OSTI; NTIS; INIS		DE95612687	
1352/93	20:8624	OSTI; NTIS; INIS		DE95612485	
1354/93	20:7772	OSTI; NTIS; INIS		DE95612944	
1355/93	20:8125	OSTI; NTIS; INIS		DE95612247	
1357/93	20:7773	OSTI; NTIS; INIS		DE95612945	
1358/93	20:9146	OSTI; NTIS; INIS		DE95613357	
1359/93	20:8236	OSTI; NTIS; INIS		DE95615810	
1360/93	20:8101	OSTI; NTIS; INIS		DE95612021	
1362/93	20:7519	OSTI; NTIS; INIS		DE95612655	
1363/93	20:9106	OSTI; NTIS; INIS		DE95614255	
1364/93	20:9107	OSTI; NTIS; INIS		DE95614256	
1365/93	20:9068	OSTI; NTIS; INIS		DE95614180	
1366/93	20:7523	OSTI; NTIS; INIS		DE95612665	
1372/93	20:7774	OSTI; NTIS; INIS		DE95612946	
1377/93	20:7673	OSTI; NTIS; INIS		DE95612929	
1378/93	20:7678	OSTI; NTIS; INIS		DE95612932	
1380/93	20:9193	OSTI; NTIS; INIS		DE95613313	
1381/93	20:8211	OSTI; NTIS; INIS		DE95612007	
1383/93	20:7757	OSTI; NTIS; INIS		DE95612554	
1384/93	20:8189	OSTI; NTIS; INIS		DE95612704	
1385/93	20:8625	OSTI; NTIS; INIS		DE95612478	
KE–					
93002B	20:8267	OSTI; NTIS (US Sales Only)		DE95744282	
93002G	20:7602	OSTI; NTIS (US Sales Only)		DE95744265	
93003B	20:7964	OSTI; NTIS (US Sales Only)		DE95744291	
93003G	20:7142	OSTI; NTIS (US Sales Only)		DE95744271	
93004B	20:7965	OSTI; NTIS (US Sales Only)		DE95744267	
93004G	20:7966	OSTI; NTIS (US Sales Only)		DE95744273	
93004S	20:7535	OSTI; NTIS (US Sales Only)		DE95744286	
93005B	20:7967	OSTI; NTIS (US Sales Only)		DE95744290	
93005G	20:7258	OSTI; NTIS (US Sales Only)		DE95744264	
93005S	20:7968	OSTI; NTIS (US Sales Only)		DE95744270	
93006B	20:8456	OSTI; NTIS (US Sales Only)		DE95744285	
93006G	20:7540	OSTI; NTIS (US Sales Only)		DE95744263	
93006S	20:7969	OSTI; NTIS (US Sales Only)		DE95744266	
93007G	20:8012	OSTI; NTIS (US Sales Only)		DE95744293	
93008S	20:7970	OSTI; NTIS (US Sales Only)		DE95744279	
93010S	20:7971	OSTI; NTIS (US Sales Only)		DE95744277	
93011B	20:7830	OSTI; NTIS (US Sales Only)		DE95744288	
93011G	20:7972	OSTI; NTIS (US Sales Only)		DE95744272	
93012G	20:8013	OSTI; NTIS (US Sales Only)		DE95744294	
93013B	20:7973	OSTI; NTIS (US Sales Only)		DE95744274	
93014G	20:7974	OSTI; NTIS (US Sales Only)		DE95744289	
93016G	20:7569	OSTI; NTIS (US Sales Only)		DE95744284	
93017G	20:8237	OSTI; NTIS (US Sales Only)		DE95744287	
93019G	20:7572	OSTI; NTIS (US Sales Only)		DE95743535	
93020G	20:7975	OSTI; NTIS (US Sales Only)		DE95744292	
93024G	20:8026	OSTI; NTIS (US Sales Only)		DE95744280	
93027G	20:7976	OSTI; NTIS (US Sales Only)		DE95744276	
93032G	20:7977	OSTI; NTIS (US Sales Only)		DE95744275	
93033G	20:7978	OSTI; NTIS (US Sales Only)		DE95744268	
93034G	20:7979	OSTI; NTIS (US Sales Only)		DE95744269	
93035G	20:8047	OSTI; NTIS (US Sales Only)		DE95744283	
93038G	20:7188	OSTI; NTIS (US Sales Only)		DE95744281	
93041G	20:8457	OSTI; NTIS (US Sales Only)		DE95743536	
KEMAKTA-AR–					
94-06.	20:7362	*See* SSI–94-07			
KEMI–					
8-94	20:7861	OSTI; NTIS		DE95737667	
KFB–					
94-9	20:8014	OSTI; NTIS		DE95737686	
KFK–					
5179	20:9108	OSTI; NTIS (US Sales Only); INIS		DE95738281	
5296	20:7524	OSTI; NTIS (US Sales Only); INIS		DE95738768	
5326	20:7788	OSTI; NTIS (US Sales Only); INIS		DE95738354	
5327	20:7798	OSTI; NTIS (US Sales Only); INIS		DE95738330	
5328	20:7322	OSTI; NTIS (US Sales Only); INIS		DE95738239	

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
5353	20:8102	OSTI; NTIS (US Sales Only); INIS		DE95738282	
5365	20:9122	OSTI; NTIS (US Sales Only); INIS		DE95738117	
5371	20:8142	OSTI; NTIS (US Sales Only)		DE95738118	
5377	20:8126	OSTI; NTIS (US Sales Only); INIS		DE95738047	
KFKI–					
1994-09/M-N	20:9173	OSTI; NTIS (US Sales Only); INIS		DE95613330	
KTH-ALF-R–					
94-1	20:9175	OSTI; NTIS; INIS		DE95613331	
94-2	20:9069	OSTI; NTIS; INIS		DE95614166	
KTM/E-A–					
5	20:7911	OSTI; NTIS		DE95737599	
KTM/E-B–					
155	20:7547	OSTI; NTIS		DE95737597	
KTM/E-D–					
202	20:7980	OSTI; NTIS		DE95737598	
LA–					
12752-MS	20:8420	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005743	MF-2070
12753-MS	20:8497	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005742	MF-2070
12814-MS	20:8458	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005915	MF-401; MF-405
12831-MS	20:8238	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006074	MF-2010
12857-ENV	20:7477	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005744	MF-2070
12863	20:7478	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005652	PC-2070
12866	20:7817	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006356	
12884	20:8948	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004863	MF-700
12885	20:8949	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004864	MF-700
12889	20:7323	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005651	PC-2070
12898-MS	20:8421	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005740	MF-721; MF-741
12909-MS	20:7263	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005914	MF-701
LA-UR–					
94-1947	20:9176	OSTI; NTIS; GPO Dep.	E 1.99:	DE95003755	
94-3466	20:8584	OSTI; NTIS; GPO Dep.	E 1.99:	DE95002710	MF-408
94-3483	20:7324	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95002717	MF-2010
94-3637	20:8459	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95002729	MF-2000
94-3685	20:8498	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95002699	MF-2020
94-3753	20:8301	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95003706	
94-4168	20:8294	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005279	MF-706
94-4179	20:9012	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005213	MF-704
94-4196	20:8703	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005212	
94-4203	20:8937	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005210	MF-700
94-4318	20:8704	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005253	
94-4333	20:9070	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005252	MF-712
94-4339	20:9177	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005251	MF-405
94-4343	20:8938	OSTI; INIS; NTIS; GPO Dep.	E 1.99:	DE95005250	MF-700
94-4365	20:8768	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005245	MF-414; MF-405
94-4371	20:7325	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005244	MF-721; MF-706
94-4382	20:9178	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005241	MF-905
94-4386	20:8681	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005239	MF-410
95-440	20:8127	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006170	MF-704
LBL–					
34244-Rev.	20:8460	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004675	MF-402; MF-1600
34468	20:7326	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006725	MF-2000
34612	20:8103	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004686	MF-410
34638	20:7981	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004676	MF-1600
35179	20:9179	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004687	MF-405

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
35238	20:9180	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004685	MF-405
35635	20:9123	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004679	MF-414; MF-420
35768	20:8844	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006730	PC-413
35912	20:8335	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006718	MF-411
35944	20:8428	OSTI; NTIS; GPO Dep.	E 1.99:	DE95003441	MF-406
35946	20:8422	OSTI; NTIS; GPO Dep.	E 1.99:	DE95003440	MF-406
35982	20:7982	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006720	MF-1600
36024	20:8302	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004689	MF-405
36050	20:8705	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004677	MF-410
36055	20:8270	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004690	MF-410
36126	20:8651	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004684	MF-802
36175	20:8734	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004670	MF-414
36180	20:8303	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004683	MF-414
36208	20:7605	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004672	MF-1242
36211	20:8499	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006719	MF-2000
36212	20:7479	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006727	MF-2010
36233	20:8304	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004673	MF-414
36273	20:8392	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004678	MF-406; MF-407
36287	20:8393	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004671	MF-414
36293	20:7831	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004680	MF-1501
36302	20:8305	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004669	MF-414
36343	20:8295	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004668	MF-414
36353	20:8803	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004691	MF-414
36379	20:8461	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006717	MF-408
36383	20:8063	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004682	MF-404; MF-401
36385	20:7327	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006722	MF-2010
36387	20:7328	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006726	MF-2010
36395	20:8027	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006721	MF-1600
36467	20:7329	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006724	MF-814
36536	20:8401	*See* SLAC-PUB–6731			
36614	20:7330	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006723	MF-814
LBL-PUB–					
3040-Rev.	20:7480	OSTI; NTIS; GPO Dep.	E 1.99:	DE95002358	MF-400
3095-Rev.1	20:8591	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004674	MF-407
LRP–					
504/94	20:9071	OSTI; NTIS; INIS		DE95614173	
509/94	20:9075	OSTI; NTIS; INIS		DE95614248	
LUNBDS-NBBE–					
94-1043	20:8643	OSTI; NTIS		DE95737654	
LUNFD6-NFFR–					
3064	20:8394	OSTI; NTIS; INIS		DE95613155	
LUTADL-TABK–					
1004	20:7983	OSTI; NTIS		DE95737668	
LUTKDH-TKKA–					
1001-1-164	20:8028	OSTI; NTIS		DE95737670	
LUTKDH-TKOO–					
1015	20:8128	OSTI; NTIS; INIS		DE95612250	
LUTMDN-TMVK–					
7016	20:8058	OSTI; NTIS		DE95737683	
7017	20:8059	OSTI; NTIS		DE95737682	
LUTVDG-TVVR–					
1011	20:7331	OSTI; NTIS; INIS		DE95613249	
1012	20:8543	OSTI; NTIS		DE95737671	
LYCEN–					
9401	20:9147	OSTI; NTIS (US Sales Only); INIS		DE95613358	
LYCEN-T–					
9416	20:8837	OSTI; NTIS (US Sales Only); INIS		DE95613799	
NASA/CR–					
191203	20:8056	*See* DOE/NASA–0329-2			

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
NBI-PR–					
160-1994	20:7984	OSTI; NTIS		DE95737645	
NEA/NSC/DOC–					
94-21	20:9138	*See* Juel–2950			
NEI-DK–					
1754	20:8500	OSTI; NTIS		DE95737555	
1755	20:8505	OSTI; NTIS		DE95737554	
1763	20:7868	OSTI; NTIS		DE95737518	
1764	20:7638	OSTI; NTIS		DE95737525	
1766	20:7889	OSTI; NTIS		DE95737524	
1768	20:8029	OSTI; NTIS		DE95737519	
1769	20:8030	OSTI; NTIS		DE95737520	
1771	20:7846	OSTI; NTIS		DE95737522	
1772	20:7609	OSTI; NTIS; INIS		DE95737560	
1773	20:7610	OSTI; NTIS; INIS		DE95737561	
1774	20:7639	OSTI; NTIS		DE95737569	
1795	20:7611	OSTI; NTIS		DE95737572	
1796	20:7985	OSTI; NTIS		DE95737563	
1797	20:7553	OSTI; NTIS		DE95737564	
1798	20:7554	OSTI; NTIS		DE95737565	
1799	20:7555	OSTI; NTIS		DE95737566	
1800	20:7556	OSTI; NTIS		DE95737567	
1801	20:7557	OSTI; NTIS		DE95737568	
1804	20:7548	OSTI; NTIS		DE95737585	
1806	20:7549	OSTI; NTIS		DE95737586	
1807	20:7550	OSTI; NTIS		DE95737588	
1808	20:7551	OSTI; NTIS		DE95737587	
1810	20:7255	OSTI; NTIS		DE95737583	
1813	20:8048	OSTI; NTIS		DE95737592	
NEI-NO–					
467	20:8031	OSTI; NTIS		DE95737634	
468	20:8253	OSTI; NTIS		DE95737635	
469	20:8652	OSTI; NTIS		DE95737637	
470	20:7250	OSTI; NTIS; INIS		DE95737638	
471	20:7245	OSTI; NTIS		DE95737639	
472	20:7194	OSTI; NTIS		DE95737640	
473	20:8254	OSTI; NTIS		DE95744875	
NEI-SE–					
170	20:7332	OSTI; NTIS; INIS		DE95613233	
172	20:7684	OSTI; NTIS; INIS		DE95613273	
179	20:9148	OSTI; NTIS; INIS		DE95613359	
180	20:8508	OSTI; NTIS; INIS		DE95612388	
183	20:7647	OSTI; NTIS; INIS		DE95615903	
185	20:7862	OSTI; NTIS; INIS		DE95737650	
186	20:8065	OSTI; NTIS		DE95737666	
NIPER/BDM–					
0086	20:7227	OSTI; NTIS; GPO Dep.	E 1.99:	DE95000130	MF-122
NKS–					
94-7-REV	20:7818	OSTI; NTIS; INIS		DE95616226	
NNU–					
0001.	20:9028	*See* CNIC–00779			
NREL/SP–					
336-7233	20:7875	OSTI; NTIS; GPO Dep.	E 1.99:	DE94011900	MF-900
NREL/TP–					
411-7402	20:7598	OSTI; NTIS; GPO Dep.	E 1.99:	DE95000277	MF-1262
411-7472	20:7583	OSTI; NTIS; GPO Dep.	E 1.99:	DE95000298	MF-1280
411-7473	20:7584	OSTI; NTIS; GPO Dep.	E 1.99:	DE95000299	MF-1280
421-7577	20:7552	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004003	MF-1404
425-6722	20:8064	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004016	MF-1504
433-6943	20:8462	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004004	MF-1303
433-7209	20:7585	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004007	MF-1400
440-7224	20:7620	OSTI; NTIS; GPO Dep.	E 1.99:	DE95000286	MF-1213
441-7077	20:7621	OSTI; NTIS; GPO Dep.	E 1.99:	DE94011862	MF-1213

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
442-7111	20:7622	OSTI; NTIS; GPO Dep.	E 1.99:	DE95000293	MF-1213
461-6684	20:7863	OSTI; NTIS; GPO Dep.	E 1.99:	DE94011843	MF-1320
463-7230	20:8049	OSTI; NTIS; GPO Dep.	E 1.99:	DE95000265	MF-1213
471-7262	20:8463	OSTI; NTIS; GPO Dep.	E 1.99:	DE95000264	MF-1303
471-7296	20:7599	OSTI; NTIS; GPO Dep.	E 1.99:	DE95000282	MF-1272
472-7023	20:7586	OSTI; NTIS; GPO Dep.	E 1.99:	DE95000261	MF-1600
473-7026	20:8062	OSTI; NTIS; GPO Dep.	E 1.99:	DE95000280	MF-1500
NUCON–					
05DE300/02	20:8024	*See* DOE/ID/13001–1			
NUREG–					
0304-Vol.19-No.3	20:7681	OSTI; NTIS; GPO; INIS		TI95005729	
1100-Vol.11	20:7682	OSTI; NTIS; GPO; INIS		TI95006182	
1435-Suppl.4	20:7819	OSTI; NTIS; GPO; INIS		TI95005546	
NUREG/CR–					
6134	20:7820	OSTI; NTIS (documentation only); ESTSC (complete software package), P.O. Box 1020, Oak Ridge, TN 37831-1020 (United States); GPO; INIS		TI95006185	
6135	20:7821	OSTI; NTIS (documentation only); ESTSC (complete software package), P.O. Box 1020, Oak Ridge, TN 37831-1020 (United States); GPO; INIS		TI95006186	
6136	20:8509	OSTI; NTIS (documentation only); ESTSC (complete software package), P.O. Box 1020, Oak Ridge, TN 37831-1020 (United States); GPO; INIS		TI95006184	
6214	20:7648	OSTI; NTIS; GPO; INIS		TI95005715	
NUTEK-FJV–					
94-7	20:8050	OSTI; NTIS		DE95737653	
NUTEK-R–					
94-44	20:7561	OSTI; NTIS; INIS		DE95616205	
94-48	20:7903	OSTI; NTIS		DE95737687	
NYSERDA–					
94-18	20:7242	OSTI; New York State Energy Research and Development Authority, Two Rockefeller Plaza, Albany, NY 12223		TI95004846	
94-19	20:7986	OSTI; New York State Energy Research and Development Authority, Two Rockefeller Plaza, Albany, NY 12223		TI95004847	
94-20	20:7536	OSTI; New York State Energy Research and Development Authority, Two Rockefeller Plaza, Albany, NY 12223 (United States)		TI95004845	
OPRI-RM–					
06-1994	20:8510	OSTI; NTIS (US Sales Only); INIS		DE95615468	
ORAU–					
94/A-24	20:8626	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004798	MF-907
94/D-58	20:8627	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004795	MF-908; MF-907
94/F-10	20:8628	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004796	MF-907
94/F-29	20:8629	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004794	MF-907
94/G-111	20:8630	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004797	MF-907
ORNL–					
6795	20:7648	*See* NUREG/CR–6214			
6818	20:8644	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004783	MF-607
6821	20:7533	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005923	MF-413
6828	20:8017	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005001	MF-1500
ORNL/CDIAC–					
69	20:9194	OSTI; NTIS; GPO Dep.	E 1.99:	DE95002299	MF-402
74	20:8544	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004743	MF-402; MF-403
ORNL/ER–					
169/S3	20:7481	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004733	MF-2010

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
ORNL/ER–					
169/S4	20:7482	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004731	MF-2070
250	20:7471	*See* DOE/OR–01-1290-D1			
251-D2	20:7298	*See* DOE/OR–01-1292-D2			
264	20:7483	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004730	MF-2070
270-D2	20:7299	*See* DOE/OR–01-1311-D2			
286	20:7484	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005736	MF-2030
ORNL/ER/Sub–					
87-99053/28	20:7333	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004736	MF-2020
ORNL/GWPO–					
012	20:7485	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005992	MF-402
ORNL/M–					
3077	20:7282	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004881	MF-603
3805	20:7297	*See* DOE/OR–01-1258-D2			
3964	20:7300	*See* DOE/OR–1047-D2			
4039	20:7485	*See* ORNL/GWPO–012			
ORNL/PPA–					
94/4	20:7876	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004833	MF-400
ORNL/Sub–					
87-SA946C/04	20:8143	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004737	MF-114; MF-113
ORNL/TM–					
12474	20:7451	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005974	MF-402; MF-405
12708	20:7334	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004784	MF-400
12744	20:9181	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004791	MF-400
12823	20:7335	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005997	MF-2000
12828	20:7336	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004734	MF-2020
12849	20:7570	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004878	MF-1404
12852	20:9182	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004876	MF-405
12853	20:9183	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006144	MF-405
12855	20:7912	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004792	MF-1322
12868	20:9149	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004738	MF-400
12875	20:8218	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005909	MF-408
12886	20:8511	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004875	MF-2040
OZ–					
93/20.	20:8771	*See* UM-P–93/80			
93/21.	20:8772	*See* UM-P–93/81			
93/25.	20:8773	*See* UM-P–93/106			
94/11.	20:8746	*See* UM-P–94/24			
94/6.	20:8842	*See* UM-P–94/19			
94/8.	20:8775	*See* UM-P–94/21			
PATENTS-US–					
A7966644	20:8271	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE95006140	MF-706
A7966925	20:8241	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE95006139	MF-706
A7967463	20:7337	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE95006138	MF-506
A7967481	20:8413	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE95006136	MF-406
A7967482	20:7822	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE95006135	MF-706
A7970883	20:8242	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE95006111	MF-506
A7971111	20:8411	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE95006109	MF-706
A7972820	20:8272	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE95006108	MF-706
A7979672	20:8412	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE95006105	MF-706
A7980888	20:8190	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE95006104	MF-701
A7980892	20:8423	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE95006103	MF-741
A7980894	20:8592	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE95006124	MF-115; MF-117
A7981450	20:7832	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE95006123	MF-706
A7981636	20:8273	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE95006122	MF-706
A7983188	20:8104	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE95006121	MF-406
A7983350	20:8414	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE95006120	MF-706
A7984598	20:8243	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE95006119	MF-706
A7986828	20:7259	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE95006118	MF-112
A7988598	20:8129	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE95006117	MF-506

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
A7989609	20:7680	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE95006116	ND-528
A7993553	20:8274	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE95006114	MF-706
A7999338	20:8172	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE95006113	MF-2000
A7999339	20:7278	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE95006112	ND-533
PINSTECH–					
129	20:7644	OSTI; NTIS (US Sales Only); INIS		DE95615899	
130	20:7751	OSTI; NTIS (US Sales Only); INIS		DE95615883	
131	20:7775	OSTI; NTIS (US Sales Only); INIS		DE95615958	
132	20:7776	OSTI; NTIS (US Sales Only); INIS		DE95615959	
133	20:7777	OSTI; NTIS (US Sales Only); INIS		DE95615960	
134	20:7758	OSTI; NTIS (US Sales Only); INIS		DE95615633	
136	20:7759	OSTI; NTIS (US Sales Only); INIS		DE95615634	
PINSTECH-HPD–					
142	20:8173	OSTI; NTIS (US Sales Only); INIS		DE95614628	
143	20:7778	OSTI; NTIS (US Sales Only); INIS		DE95615957	
PINSTECH-NPD–					
136	20:7779	OSTI; NTIS (US Sales Only); INIS		DE95615650	
PINSTECH-RIAD–					
136	20:7161	OSTI; NTIS (US Sales Only); INIS		DE95615651	
137	20:7534	OSTI; NTIS (US Sales Only); INIS		DE95615771	
138	20:8174	OSTI; NTIS (US Sales Only); INIS		DE95614629	
139	20:8545	OSTI; NTIS (US Sales Only); INIS		DE95615488	
PNL–					
10121	20:8007	OSTI; NTIS; GPO Dep.	E 1.99:	DE95007015	MF-1600
10134	20:7338	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005754	MF-2030
10173	20:7339	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95002322	MF-2030
10176	20:7340	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95002585	MF-606
10184	20:7486	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95002856	MF-2010
10194	20:7341	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005752	MF-2010
10195	20:8512	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004225	MF-902
10222	20:7600	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005751	MF-1340
10258	20:7878	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004948	MF-900
10283	20:7342	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006368	MF-2030
10286	20:7760	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005753	MF-402
10365	20:8037	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006191	MF-1600
10382	20:9184	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005755	MF-400
10387	20:8008	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006488	MF-1600
10398-Vol.1	20:7343	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006193	MF-2050
10398-Vol.2	20:7344	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006194	MF-2050
10415	20:7864	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006370	MF-2010
9410-4	20:7877	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005717	MF-900
PNL-SA–					
19604	20:7752	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004569	
21497	20:7345	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004561	MF-2030
21635	20:8105	OSTI; INIS; NTIS; GPO Dep.	E 1.99:	DE95004557	MF-516
21776	20:8631	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004562	MF-606; MF-607
21810	20:8870	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004938	MF-413
22048	20:8395	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004563	MF-606; MF-607
23718	20:7346	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004900	MF-2030
23723	20:7347	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004578	MF-2000
23775	20:7452	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004940	MF-2070
23824	20:9185	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004928	MF-705

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
PNL-SA–					
23839	20:7487	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004572	MF-402
23952	20:7348	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004957	MF-2030
24009	20:8396	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004571	MF-406
24010	20:8397	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004570	MF-406; MF-407
24024	20:8632	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004547	MF-408
24027	20:7349	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004559	MF-2030
24072	20:8244	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004898	MF-2060
24129	20:9124	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004573	MF-423
24144	20:8398	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004564	MF-2070
24176	20:7453	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004567	MF-405; MF-402
24344	20:8409	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004558	MF-506
24367	20:8038	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004568	MF-2000
24394	20:8464	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004579	MF-906
24417	20:7571	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004556	MF-401
24552	20:8191	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004576	MF-401
24553	20:8055	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004577	MF-401
24557	20:7231	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004942	MF-125
24672	20:7350	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004560	MF-2020
24698	20:7351	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004926	MF-2030
24741	20:7352	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004936	MF-2030
24935	20:8546	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004548	MF-402; MF-405
25031	20:9186	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004909	MF-905
25050	20:7353	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004937	MF-2060
25145	20:7251	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004565	MF-131
25192	20:8633	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004575	MF-406
25339	20:8593	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004566	MF-408
25345	20:8192	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004896	MF-2010
25425	20:8144	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004907	MF-401; MF-404
PPPL–					
2999	20:9076	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006238	PC-420
3025	20:9125	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006372	PC-420
3026	20:9077	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006236	PC-420; PC-427
3027	20:9078	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006235	PC-426
3029	20:9079	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006234	PC-426
3030	20:9080	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006233	PC-420; PC-427
3031	20:8275	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006232	PC-426
3032	20:8706	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006231	PC-427
3033	20:9081	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006230	PC-426; PC-427
3034	20:9082	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006228	PC-420; PC-426
3036	20:9083	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006229	PC-420; PC-426; PC-427
3038	20:9084	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006374	PC-426
3040	20:9085	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006190	PC-427
3042	20:9086	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006373	PC-420; PC-426
3044	20:9087	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006189	PC-420; PC-427
3045	20:9088	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006188	PC-420; PC-426
PPPL-CFP–					
3185	20:9089	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005540	MF-420

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
PRRC–					
94-26	20:7220	*See* DOE/BC/14977–1			
94-49	20:7191	*See* DOE/BC/14893–4			
94-50	20:7221	*See* DOE/BC/14977–2			
PSI–					
94-10	20:7890	OSTI; NTIS		DE95743546	
94-17	20:7667	OSTI; NTIS; INIS		DE95615943	
94-21	20:8513	OSTI; NTIS; INIS		DE95612389	
RCHEP–					
94/13.	20:8747	*See* UM-P–94/50			
94/15.	20:8707	*See* UM-P–94/54			
94/16.	20:8748	*See* UM-P–94/58			
94/17.	20:8822	*See* UM-P–94/63			
94/18.	20:8749	*See* UM-P–94/64			
94/22.	20:8750	*See* UM-P–94/74			
94/23.	20:8751	*See* UM-P–94/78			
94/26.	20:8752	*See* UM-P–94/96			
RISO-R–					
714(EN)	20:7623	OSTI; NTIS; Also available from Risoe Library, P.O. Box 49, DK-4000 Roskilde, Denmark		DE95737595	
730(EN)	20:7624	OSTI; NTIS; Also available from Risoe Library, P.O. Box 49, DK-4000 Roskilde, Denmark		DE95737571	
748(EN)	20:8989	OSTI; NTIS; INIS		DE95616726	
762(EN)	20:7946	OSTI; NTIS; Also available from Risoe Library, P.O. Box 49, DK-4000 Roskilde, Denmark		DE95737593	
785(DA)	20:7879	OSTI; NTIS; Also available from Risoe Library, P.O. Box 49, DK-4000 Roskilde, Denmark		DE95737570	
786(DA)	20:7558	OSTI; NTIS; Also available from Risoe Library, P.O. Box 49, DK-4000 Roskilde, Denmark		DE95737594	
RPII–					
94/3	20:8465	OSTI; NTIS (US Sales Only); INIS		DE95612435	
RVF-R–					
94-7	20:7562	OSTI; NTIS		DE95737669	
SAND–					
88-0824C	20:7511	OSTI; NTIS; GPO Dep.	E 1.99:	DE88007607	MF-13
93-2122	20:8039	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004728	MF-1414
93-2370	20:7820	*See* NUREG/CR–6134			
93-2371	20:7821	*See* NUREG/CR–6135			
93-2372	20:8509	*See* NUREG/CR–6136			
94-1392C	20:9126	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004544	MF-712
94-1402C	20:8255	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004759	MF-705
94-1403C	20:8256	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004758	MF-705
94-1546C	20:7587	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004531	MF-1260
94-1557C	20:7588	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004780	MF-1260
94-1562C	20:7589	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004540	MF-1261
94-1563C	20:7590	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004539	MF-1260
94-1570C	20:7591	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004532	MF-1270
94-1571C	20:7592	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004781	MF-1261
94-1597C	20:7593	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004779	MF-700
94-1613C	20:7594	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005423	MF-1280; MF-1261
94-1653C	20:8145	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004766	MF-704
94-1692C	20:8146	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004555	MF-704
94-1693C	20:8193	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006321	MF-701
94-1703C	20:8147	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006320	MF-404
94-1718C	20:7488	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004527	MF-2010
94-1810C	20:8106	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004546	MF-731
94-1990C	20:8424	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004545	MF-742
94-2056C	20:8130	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004519	MF-700
94-2064C	20:8257	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004553	MF-706
94-2163	20:7649	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004726	

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
94-2170C	20:7650	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004727	
94-2206C	20:8276	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006319	MF-706
94-2257	20:7880	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005443	MF-404
94-2531C	20:8277	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004533	MF-706
94-2533	20:7847	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004958	MF-900
94-2568	20:8040	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004692	MF-1414
94-2617C	20:8131	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004778	MF-704; MF-706
94-2709C	20:7823	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004542	
94-2731	20:8278	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004549	MF-706; MF-704
94-2763C	20:7833	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004769	MF-704
94-2831C	20:8148	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004543	MF-704
94-2922C	20:8279	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004520	MF-706
94-2944C	20:8149	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004541	MF-706
94-3047C	20:8107	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004552	MF-704
94-3062C	20:7866	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004554	MF-702
94-3070C	20:8980	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005414	MF-704
94-3077C	20:7595	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004729	MF-1260
94-3078C	20:7596	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004782	MF-1280
94-3093C	20:7246	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004772	MF-126
94-3122C	20:9150	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004538	MF-700
94-3147C	20:8175	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004765	MF-704
94-3183C	20:8194	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006313	MF-113
94-3190C	20:8258	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004757	MF-705
94-3252	20:8425	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005913	MF-700
94-8237	20:8963	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006195	MF-411
94-8238	20:8466	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006853	MF-704
94-8251	20:8176	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006196	MF-706
94-8780	20:7560	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006198	MF-900
95-0067	20:9195	OSTI; NTIS (US Sales Only); GPO Dep.	E 1.99:	DE95005911	MF-700
95-0108C	20:8222	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006311	MF-706
95-8002	20:7356	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006199	MF-2000
95-8007	20:7357	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006200	MF-2020
95-8455C	20:8108	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004384	MF-706
SEAB–					
95006873	20:7881	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006873	MF-900
SEI-EED–					
37	20:8009	OSTI; NTIS		DE95737665	
SINRE–					
0040.	20:8609	*See* CNIC–00774			
SIP–					
0066.	20:9043	*See* CNIC–00784			
SKB-TR–					
94-04	20:7358	OSTI; NTIS; INIS		DE95613252	
94-08	20:7359	OSTI; NTIS; INIS		DE95613253	
94-09	20:8514	OSTI; NTIS; INIS		DE95615486	
94-10	20:8195	OSTI; NTIS; INIS		DE95611797	
94-11	20:7360	OSTI; NTIS; INIS		DE95616117	
94-14	20:7361	OSTI; NTIS; INIS		DE95613254	
SLAC–					
450	20:8150	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006149	PC-404
SLAC-PUB–					
6290	20:8838	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005938	MF-414
6338	20:8296	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005940	MF-414
6527	20:8306	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005942	MF-414
6549	20:8804	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005943	MF-414
6550	20:8805	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005944	MF-414
6566	20:8327	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006093	MF-414
6567	20:9187	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006215	MF-414
6584	20:8839	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005945	MF-414
6591	20:8806	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005946	MF-414
6597	20:8807	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005947	MF-414
6598	20:8808	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005948	MF-414
6599	20:8809	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005949	MF-414
6600	20:8810	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005950	MF-414

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
6602	20:8811	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006051	MF-414
6604	20:8307	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006052	MF-414
6617	20:8328	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006053	MF-414
6621	20:8308	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006054	MF-414
6625	20:8950	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006055	MF-414
6639	20:8812	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006056	MF-414
6640	20:8735	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006057	MF-414
6645	20:8813	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006058	MF-414
6646	20:8297	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006059	MF-414
6647	20:8814	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006060	MF-414
6648	20:8815	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006145	MF-414
6653	20:8816	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006061	MF-414
6658	20:8769	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006062	MF-414
6659	20:8817	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006063	MF-414
6662	20:8736	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006064	MF-414
6669	20:8399	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006065	MF-414
6673	20:8737	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006066	MF-414
6674	20:8818	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006067	MF-414
6685	20:8738	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006151	MF-414
6694	20:8329	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006214	MF-414
6700	20:8770	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006213	MF-414
6701	20:8400	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006068	MF-414
6702	20:8330	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006069	MF-414
6718	20:8682	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006070	MF-414
6730	20:8840	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006071	MF-414
6731	20:8401	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006072	MF-414
6735	20:8281	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006073	MF-414
95-6745	20:8326	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006212	MF-414
SLAC/SSRL–					
0089	20:8150	*See* SLAC–450			
SLU-EKOMIL-R–					
67	20:7538	OSTI; NTIS		DE95737677	
68	20:8515	OSTI; NTIS		DE95737672	
SLU-JBT-R–					
93	20:8467	OSTI; NTIS		DE95737652	
SLU-REK-R–					
73	20:8634	OSTI; NTIS; INIS		DE95612522	
74	20:7884	OSTI; NTIS; INIS		DE95616129	
75	20:8635	OSTI; NTIS; INIS		DE95612523	
SMC–					
0100.	20:8610	*See* CNIC–00796			
SNERDI–					
0021.	20:7651	*See* CNIC–00769			
SNV–					
4244	20:8516	OSTI; NTIS		DE95737655	
SP–					
94-65	20:8109	OSTI; NTIS		DE95737656	
SPSLC/M–					
491.	20:8819	*See* UM-P–92/92			
SR/H–					
845	20:7767	*See* DPW–55-16-39			
857	20:7705	*See* DPW–55-17-23			
858	20:7310	*See* DPW–55-4-40			
870	20:7308	*See* DPW–55-4-9			
871	20:7309	*See* DPW–55-4-10			
SR/OOG–					
94-03	20:7238	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004836	MF-950
SSCL-N–					
846	20:8415	*See* BNL–61272			
SSI–					
94-07	20:7362	OSTI; NTIS; INIS		DE95613234	
STI/PUB–					
901.	20:7316	*See* INIS-mf–14431			
STUDSVIK-ES–					
94-32	20:8547	OSTI; NTIS; INIS		DE95612428	
STUDSVIK-M–					
94-131	20:8265	OSTI; NTIS		DE95737678	
94-61	20:7256	OSTI; NTIS		DE95737679	
94-86	20:8219	OSTI; NTIS; INIS		DE95611879	
STUK-YTO-TR–					
54	20:7632	OSTI; NTIS		DE95737615	

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
SU-GP–					
93/7-8.	20:8740	*See* UM-P–93/77			
SVF–					
521	20:8468	OSTI; NTIS		DE95737674	
522	20:8110	OSTI; NTIS		DE95737675	
523	20:8177	OSTI; NTIS		DE95737676	
SVF-O–					
97	20:7867	OSTI; NTIS		DE95737673	
TRITA-ALF–					
94-1.	20:9175	*See* KTH-ALF-R–94-1			
94-2.	20:9069	*See* KTH-ALF-R–94-2			
TSHUNE–					
0071.	20:8153	*See* CNIC–00793			
TTKK-LT–					
90	20:7186	OSTI; NTIS		DE95737622	
92	20:8259	OSTI; NTIS		DE95737624	
93	20:8260	OSTI; NTIS		DE95737625	
TTKK/TST–					
2/94	20:7827	OSTI; NTIS		DE95737621	
UBA-FB–					
94-077	20:8530	*See* GKSS–94/E/10			
UCRL–					
52000-94-10	20:9129	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95006377	PC-700
UCRL-CR–					
116651	20:8429	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005994	MF-702
117355	20:7363	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005973	MF-702
UCRL-ID–					
117120	20:7364	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004196	MF-2030
117401	20:8548	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004198	MF-402
118009	20:7365	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005658	MF-800
119235	20:8111	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006379	MF-904
119479	20:8426	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005659	MF-702
119551	20:8427	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005660	MF-702
UCRL-JC–					
116575	20:8653	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004966	MF-702
118082	20:8645	OSTI; NTIS; GPO Dep.	E 1.99:	DE95006167	MF-702
118634	20:8220	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005919	MF-405
UCRL-LR–					
114070-7	20:8068	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005655	PC-700
UM-P–					
92/84	20:8683	OSTI; NTIS (US Sales Only); INIS		DE95616243	
92/86	20:8151	OSTI; NTIS (US Sales Only); INIS		DE95615391	
92/92	20:8819	OSTI; NTIS (US Sales Only); INIS		DE95616347	
93/100b	20:8594	OSTI; NTIS (US Sales Only); INIS		DE95615699	
93/106	20:8773	OSTI; NTIS (US Sales Only); INIS		DE95616332	
93/107	20:8744	OSTI; NTIS (US Sales Only); INIS		DE95616278	
93/108	20:8774	OSTI; NTIS (US Sales Only); INIS		DE95616333	
93/111	20:8939	OSTI; NTIS (US Sales Only); INIS		DE95616427	
93/112	20:8745	OSTI; NTIS (US Sales Only); INIS		DE95616279	
93/117	20:8841	OSTI; NTIS (US Sales Only); INIS		DE95616384	
93/75	20:8739	OSTI; NTIS (US Sales Only); INIS		DE95616280	
93/77	20:8740	OSTI; NTIS (US Sales Only); INIS		DE95616281	
93/80	20:8771	OSTI; NTIS (US Sales Only); INIS		DE95616315	
93/81	20:8772	OSTI; NTIS (US Sales Only); INIS		DE95616316	
93/84	20:8820	OSTI; NTIS (US Sales Only); INIS		DE95616348	
93/87	20:8741	OSTI; NTIS (US Sales Only); INIS		DE95616282	
93/88	20:8821	OSTI; NTIS (US Sales Only); INIS		DE95616349	
93/90	20:8742	OSTI; NTIS (US Sales Only); INIS		DE95616283	
93/91	20:8743	OSTI; NTIS (US Sales Only); INIS		DE95616284	
93/93	20:8132	OSTI; NTIS (US Sales Only); INIS		DE95615349	
93/94	20:8867	OSTI; NTIS (US Sales Only); INIS		DE95616389	
93/98	20:8133	OSTI; NTIS (US Sales Only); INIS		DE95615230	
94/09	20:8684	OSTI; NTIS (US Sales Only); INIS		DE95616244	
94/17	20:8957	OSTI; NTIS (US Sales Only); INIS		DE95616458	
94/19	20:8842	OSTI; NTIS (US Sales Only); INIS		DE95616383	
94/21	20:8775	OSTI; NTIS (US Sales Only); INIS		DE95616337	
94/24	20:8746	OSTI; NTIS (US Sales Only); INIS		DE95616276	
94/27	20:8134	OSTI; NTIS (US Sales Only); INIS		DE95615231	
94/33	20:8941	OSTI; NTIS (US Sales Only); INIS		DE95616415	
94/34	20:9013	OSTI; NTIS (US Sales Only); INIS		DE95616775	

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
94/38	20:8942	OSTI; NTIS (US Sales Only); INIS		DE95616428	
94/39	20:8135	OSTI; NTIS (US Sales Only); INIS		DE95615232	
94/41	20:8943	OSTI; NTIS (US Sales Only); INIS		DE95616435	
94/43	20:8878	OSTI; NTIS (US Sales Only); INIS		DE95616407	
94/44	20:8990	OSTI; NTIS (US Sales Only); INIS		DE95616727	
94/45	20:9014	OSTI; NTIS (US Sales Only); INIS		DE95616776	
94/50	20:8747	OSTI; NTIS (US Sales Only); INIS		DE95616302	
94/52	20:9015	OSTI; NTIS (US Sales Only); INIS		DE95616777	
94/54	20:8707	OSTI; NTIS (US Sales Only); INIS		DE95616271	
94/55	20:9016	OSTI; NTIS (US Sales Only); INIS		DE95616778	
94/56	20:9017	OSTI; NTIS (US Sales Only); INIS		DE95616779	
94/57	20:9018	OSTI; NTIS (US Sales Only); INIS		DE95616780	
94/58	20:8748	OSTI; NTIS (US Sales Only); INIS		DE95616285	
94/60	20:8686	OSTI; NTIS (US Sales Only); INIS		DE95616267	
94/63	20:8822	OSTI; NTIS (US Sales Only); INIS		DE95616373	
94/64	20:8749	OSTI; NTIS (US Sales Only); INIS		DE95616286	
94/7	20:8940	OSTI; NTIS (US Sales Only); INIS		DE95616412	
94/74	20:8750	OSTI; NTIS (US Sales Only); INIS		DE95616287	
94/76	20:8708	OSTI; NTIS (US Sales Only); INIS		DE95616272	
94/78	20:8751	OSTI; NTIS (US Sales Only); INIS		DE95616277	
94/89	20:9025	OSTI; NTIS (US Sales Only); INIS		DE95616903	
94/92	20:8331	OSTI; NTIS (US Sales Only); INIS		DE95615825	
94/93	20:8964	OSTI; NTIS (US Sales Only); INIS		DE95616466	
94/96	20:8752	OSTI; NTIS (US Sales Only); INIS		DE95616288	
USGS-OFR–					
92-657	20:7366	OSTI; NTIS; INIS; U.S. Geological Survey, Earth Science Information Center, Open-File Reports Section, Box 25286, MS 517, Denver Federal Center, Denver, CO 80225; GPO Dep.	E 1.99:	DE95005995	MF-814
USGS/OFR–					
94-303	20:7454	OSTI; NTIS; INIS; U.S. Geological Survey, Earth Science Information Center, Open-File Reports Section, Box 25286, MS 517, Denver Federal Center, Denver, CO 80225; GPO Dep.	E 1.99:	DE95004831	MF-814
UTS-DFT–					
94-15.	20:8791	*See* IC–94/327			
VF-BIO–					
94-5	20:8517	OSTI; NTIS; INIS		DE95615487	
VTT-BIOENERGIA–					
4	20:7541	OSTI; NTIS		DE95737611	
VTT-TIED–					
1445	20:7640	OSTI; NTIS		DE95737600	
VYH-JULK–					
A167	20:7580	OSTI; NTIS		DE95700207	
VYH-PUB–					
13	20:8549	OSTI; NTIS		DE95737601	
WHC-EP–					
0446-2	20:8518	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95002361	MF-2070
0532-Rev.2	20:7489	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005054	MF-2030
0797	20:7490	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95002469	MF-2070
0809	20:7367	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95002106	MF-2030
0813	20:7455	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005055	MF-2010
0829	20:7368	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005056	MF-2020
0832	20:7369	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005982	MF-2030
0839	20:7370	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005477	MF-2070
WHC-SA–					
1769	20:9196	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005461	MF-905
2407	20:7371	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004488	MF-2030
2505	20:7372	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004362	MF-2000

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
2731	20:7491	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004787	MF-905
WHC-SD-339-SDR–002-Rev.1	20:7512	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005634	MF-600
WHC-SD-CP-RPT–012-Rev.1	20:7492	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004487	MF-2050
WHC-SD-EN-PRS–002	20:7493	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005629	MF-2050
WHC-SD-EN-TI–241	20:7456	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004508	MF-2070
292	20:8410	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004512	MF-2000
WHC-SD-FF-DRR–00018	20:7283	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005286	MF-2000
WHC-SD-GN-CSCM–30022	20:7287	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004493	MF-400
WHC-SD-GN-TRP–20026	20:7494	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004492	MF-2000
WHC-SD-L225-ATP–001	20:7373	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004786	MF-2000
WHC-SD-LEF-TS–001	20:7374	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005462	MF-2020
WHC-SD-NR-CSER–014-Rev.1	20:7375	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004753	MF-2000
WHC-SD-PRP-HA–014	20:7495	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004756	MF-2070
WHC-SD-SNF-AP–001	20:8636	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005630	MF-2070
WHC-SD-SNF-CSER–002	20:7376	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004495	MF-2030
WHC-SD-SNF-EDL–001	20:7284	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005643	MF-2050
WHC-SD-SNF-PTR–001	20:7666	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004788	MF-2020
WHC-SD-SNF-SARR–003	20:7377	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005622	MF-2000
004	20:7378	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004494	MF-2070
WHC-SD-SNF-TA–002	20:7496	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005645	MF-2050
003	20:7497	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005646	MF-2050
WHC-SD-SQA-CSA–20381	20:8245	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004750	MF-2000
20384	20:8246	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004491	MF-2070
WHC-SD-T100-PMP–001	20:7498	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005288	MF-2000
WHC-SD-TD-CR–001	20:7379	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005464	MF-2060
WHC-SD-TD-CSWD–002	20:9151	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004748	MF-700
WHC-SD-TD-ICD–001	20:7380	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005068	MF-2030

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
WHC-SD-TD-RPT–					
010	20:8178	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95002365	MF-2020
WHC-SD-W007H-ATR–					
001	20:7381	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005650	MF-2050
WHC-SD-W025-VI–					
001	20:7382	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95002083	MF-2020
WHC-SD-W049H-ICD–					
001-Rev.1	20:7383	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004472	MF-2020
WHC-SD-W100-AP–					
002	20:7384	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95002113	MF-2020
WHC-SD-W151-ANAL–					
001	20:7385	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004749	MF-2030
WHC-SD-W236A-ER–					
008	20:7386	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95002144	MF-2030
WHC-SD-W314B-DA–					
002	20:7387	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004424	MF-2030
WHC-SD-W320-QAPP–					
001-Rev.1	20:7388	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004474	MF-2050
WHC-SD-W337-ATP–					
001	20:7457	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004754	MF-2070
WHC-SD-W337-OTP–					
001	20:7458	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005284	MF-2070
WHC-SD-W340-ES–					
002	20:7389	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004785	MF-2050; MF-2030
WHC-SD-W378-SP–					
001	20:7390	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95002155	MF-2020
WHC-SD-WM-ANAL–					
039	20:7499	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005975	MF-2030
040	20:7391	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005991	MF-2070
WHC-SD-WM-ATP–					
093	20:7392	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004510	MF-2030
113	20:7393	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005989	MF-2060
WHC-SD-WM-ATR–					
082	20:7394	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005293	MF-2030
WHC-SD-WM-DA–					
144	20:7395	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004752	MF-2030
159	20:7396	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95002158	MF-2030
WHC-SD-WM-DP–					
073	20:7397	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005988	MF-2030; MF-2070
075	20:7398	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005283	MF-2070; MF-2030
080	20:7500	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005057	MF-2070; MF-2030

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
WHC-SD-WM-ER-					
332	20:7399	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004503	MF-2020
349	20:7400	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004789	MF-2030
352	20:7401	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004790	MF-2030
391	20:7501	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005429	MF-2000
WHC-SD-WM-ES-					
316	20:7402	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005430	MF-2020
WHC-SD-WM-FDC-					
032	20:7403	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95002159	MF-2030
WHC-SD-WM-FHA-					
006	20:7502	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005625	MF-2020
WHC-SD-WM-OTP-					
167	20:7404	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004501	MF-2030
168	20:7405	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004751	MF-2060
170	20:8247	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005980	MF-2050
171	20:7406	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005627	MF-2050
WHC-SD-WM-OTR-					
170	20:8248	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005986	MF-2050
WHC-SD-WM-SARR-					
012-Rev.1	20:7407	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004755	MF-2030
WHC-SD-WM-SDR-					
008	20:7408	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005469	MF-906
WHC-SD-WM-SOIL-					
001	20:7409	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005299	MF-2030
WHC-SD-WM-TA-					
154	20:7410	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005052	MF-2030
156	20:7411	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004747	MF-2030
WHC-SD-WM-TI-					
386	20:7412	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005077	MF-2030
608-Rev.1	20:7413	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004490	MF-2070
666	20:7414	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004502	MF-2030
680	20:7459	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005051	MF-2070
WHC-SD-WM-TP-					
163	20:7415	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95002111	MF-2070
180	20:7416	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005623	MF-2050
206	20:7417	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004977	MF-2030; MF-2070
219-Rev.1	20:7418	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95002118	MF-2070
293	20:7419	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004978	MF-2030
298	20:7420	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005976	MF-2070
WHC-SD-WM-TRP-					
229	20:7421	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005987	MF-2030

Report Number	Abstract Number	Source of Availability	GPO Dep.	Order Number	Distribution Category
WHC-SD-WM-VI–					
014	20:7422	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005624	MF-2020
WHC-SD-WM-WP–					
218-Rev.1	20:7423	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005990	MF-2030
WHC-SP–					
1108	20:7424	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004976	MF-2020
1118	20:9152	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004970	MF-900
WSRC-MS–					
94-0203P	20:7425	OSTI; INIS; NTIS; GPO Dep.	E 1.99:	DE95005885	MF-721
94-0418	20:7503	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95002689	MF-702
94-0453	20:7426	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95060088	MF-700
94-0600	20:7427	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004349	MF-721
94-0608	20:7428	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005888	MF-721; MF-704
94-0632	20:7697	OSTI; NTIS; GPO Dep.	E 1.99:	DE95060082	MF-706
95-0012	20:7429	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95060083	MF-2020
95-0013	20:7430	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95060084	MF-721
95-0025	20:7431	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95060086	MF-721
95-0028	20:7432	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95060087	MF-2070
WSRC-RP–					
94-01140	20:7504	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95060078	MF-706
94-1272	20:7433	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005881	MF-721
94-522	20:7460	OSTI; NTIS; GPO Dep.	E 1.99:	DE95060074	MF-705
94-584	20:7461	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95060080	MF-2020
94-585	20:7462	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95060081	MF-2020
WSRC-TR–					
93-301-Rev.3	20:7505	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95060076	MF-705
94-0221	20:7434	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005011	MF-721
94-0224-Rev.1	20:7506	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005012	MF-711
94-0311	20:7435	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005889	MF-702
94-0326	20:7436	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004802	MF-721
94-0345	20:8519	OSTI; NTIS; GPO Dep.	E 1.99:	DE95002663	MF-703; MF-721
94-0350	20:7507	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004807	MF-702
94-0366	20:7285	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004800	MF-714
94-0437	20:7437	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004806	MF-706; MF-701
94-0438	20:7286	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95002694	MF-721
94-0462	20:7438	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95002695	MF-702
94-0490	20:8520	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005892	MF-702
94-0493	20:8521	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005891	MF-702
94-0494	20:7463	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95005971	MF-702
94-0495	20:8522	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005890	MF-702
94-0509	20:7439	OSTI; NTIS; GPO Dep.	E 1.99:	DE95060075	MF-706
94-0524	20:7508	OSTI; NTIS; GPO Dep.	E 1.99:	DE95004829	MF-702
94-0539	20:7464	OSTI; NTIS; GPO Dep.	E 1.99:	DE95060077	MF-702
94-054	20:8637	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95004799	MF-707
94-100-6	20:7260	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005008	MF-700
94-100-8	20:7261	OSTI; NTIS; GPO Dep.	E 1.99:	DE95005014	MF-700
95-0014	20:7440	OSTI; NTIS; INIS; GPO Dep.	E 1.99:	DE95060085	MF-721

Order Number Correlation

The correlation list is provided for those organizations that file documents by report number but may receive requests by order number. For more information about a document, refer to the Report Number Index.

Order No.	*Report No.*
DE88007607	SAND–88-0824C
DE89003853	CONF-8810273–
DE94000200	DOE/BC–94/1
DE94000271	DOE/CH/10093–273
DE94011843	NREL/TP–461-6684
DE94011862	NREL/TP–441-7077
DE94011892	DOE/GO–10094-005
DE94011900	NREL/SP–336-7233
DE94012258	DOE/MC/26006–3824
DE94012262	DOE/METC–94/1009
DE94012286	DOE/MC/27362–3860
DE94012289	DOE/MC/22118–3865
DE94012353	DOE/PC/90096–T7
DE94017504	DOE/ID/12772–3
DE95000006	DOE/MC/29119–3881
DE95000034	DOE/MC/29246–3941
DE95000035	DOE/MC/30252–3945
DE95000036	DOE/MC/29246–3944
DE95000038	DOE/MC/27391–3943
DE95000042	DOE/MC/27363–3870
DE95000121	DOE/BC/14662–15
DE95000125	DOE/BC/14952–10
DE95000127	DOE/BC/14664–12
DE95000129	DOE/BC–95000129
DE95000130	NIPER/BDM–0086
DE95000257	DOE/GO–10094-037
DE95000259	DOE/GO–10094-039
DE95000261	NREL/TP–472-7023
DE95000264	NREL/TP–471-7262
DE95000265	NREL/TP–463-7230
DE95000277	NREL/TP–411-7402
DE95000280	NREL/TP–473-7026
DE95000282	NREL/TP–471-7296
DE95000286	NREL/TP–440-7224
DE95000293	NREL/TP–442-7111
DE95000298	NREL/TP–411-7472
DE95000299	NREL/TP–411-7473
DE95000355	DOE/PC/89788–T15
DE95001703	DOE/BC/14856–1
DE95001934	DOE/PC/89805–T9
DE95002011	EGG-WTD–11252-Vol.1
DE95002018	EGG-WM–11049
DE95002019	EGG-WM–11467
DE95002083	WHC-SD-W025-VI–001
DE95002106	WHC-EP–0809
DE95002111	WHC-SD-WM-TP–163
DE95002113	WHC-SD-W100-AP–002
DE95002118	WHC-SD-WM-TP–219-Rev.1
DE95002128	DOE/ER/60490–T5
DE95002129	DOE/ER/60490–T6
DE95002144	WHC-SD-W236A-ER–008
DE95002155	WHC-SD-W378-SP–001
DE95002158	WHC-SD-WM-DA–159
DE95002159	WHC-SD-WM-FDC–032
DE95002299	ORNL/CDIAC–69
DE95002322	PNL–10173
DE95002358	LBL-PUB–3040-Rev.
DE95002361	WHC-EP–0446-2
DE95002365	WHC-SD-TD-RPT–010
DE95002378	DPW–55-16-39
DE95002414	BNL–60883
DE95002435	DPW–55-17-23
DE95002436	DPW–55-4-40
DE95002469	WHC-EP–0797
DE95002498	DPW–55-4-9
DE95002499	DPW–55-4-10
DE95002579	DOE/PC/92159–T9
DE95002580	DOE/ET–0136
DE95002585	PNL–10176
DE95002658	DOE/ID/12779–3
DE95002663	WSRC-TR–94-0345
DE95002669	DOE/EA–0575
DE95002675	DOE/EA–0931
DE95002676	DOE/EA–0962
DE95002689	WSRC-MS–94-0418
DE95002694	WSRC-TR–94-0438
DE95002695	WSRC-TR–94-0462
DE95002699	LA-UR–94-3685
DE95002710	LA-UR–94-3466
DE95002717	LA-UR–94-3483
DE95002729	LA-UR–94-3637
DE95002856	PNL–10184
DE95002981	ANL/DIS/CP–84374
DE95003115	DOE/BP/23720–21
DE95003120	DOE/BP/25105–1
DE95003265	ACHRE–95003265
DE95003385	DOE/METC/C–94/7150
DE95003440	LBL–35946
DE95003441	LBL–35944
DE95003706	LA-UR–94-3753
DE95003749	CONF-950304–5
DE95003755	LA-UR–94-1947
DE95003789	DOE/ER/60656–7
DE95003833	DOE/NV/10845–35
DE95003934	CONF-9404227–1
DE95003946	BNL–60283
DE95003948	BNL–60429
DE95003949	BNL–61019
DE95003950	BNL–60964
DE95003955	BNL–61007
DE95003959	BNL–61014
DE95003962	BNL–61011
DE95004003	NREL/TP–421-7577
DE95004004	NREL/TP–433-6943
DE95004007	NREL/TP–433-7209
DE95004016	NREL/TP–425-6722
DE95004129	ANL/CMB/CP–82396
DE95004182	CONF-9310397–Summ.
DE95004183	CONF-9304276–Summ.
DE95004186	ANL/EAD/TM–33
DE95004196	UCRL-ID–117120
DE95004198	UCRL-ID–117401
DE95004212	DOE/ID/12833–1
DE95004225	PNL–10195
DE95004231	BNL–60744
DE95004232	BNL–61114
DE95004238	FNAL/C–94/373
DE95004241	DOE/TP–0001
DE95004256	DOE/PC/91050–T8-Vol.1
DE95004258	DOE/PC/91050–T8-Vol.4
DE95004260	DOE/ER/14217–2
DE95004313	DOE/PC/91161–T9
DE95004349	WSRC-MS–94-0600
DE95004362	WHC-SA–2505
DE95004372	DOE/ER/40878–T1
DE95004373	DOE/ER/40888–T1
DE95004374	DOE/ER/40879–T1
DE95004376	DOE/ER/40736–T1
DE95004384	SAND–95-8455C
DE95004421	GRI–93/0091
DE95004424	WHC-SD-W314B-DA–002
DE95004437	DOE/ER/40354–5
DE95004438	DOE/ID/13001–1
DE95004439	DOE/ER/14227–3
DE95004440	DOE/ER/79214–1
DE95004445	DOE/ER/61670–1
DE95004446	DOE/ER/13520–T1
DE95004447	DOE/ER/13520–T2
DE95004448	DOE/ER/45237–T3
DE95004449	DOE/ER/61032–T2
DE95004450	DOE/ER/45201–T2
DE95004453	DOE/PC/89903–T16
DE95004454	DOE/PC/89903–T17
DE95004455	DOE/PC/89903–T18
DE95004460	CONF-9308258–Absts.
DE95004466	DOE/IE/10859–T4
DE95004472	WHC-SD-W049H-ICD–001-Rev.1
DE95004474	WHC-SD-W320-QAPP–001-Rev.1
DE95004487	WHC-SD-CP-RPT–012-Rev.1
DE95004488	WHC-SA–2407
DE95004490	WHC-SD-WM-TI–608-Rev.1
DE95004491	WHC-SD-SQA-CSA–20384
DE95004492	WHC-SD-GN-TRP–20026
DE95004493	WHC-SD-GN-CSCM–30022
DE95004494	WHC-SD-SNF-SARR–004
DE95004495	WHC-SD-SNF-CSER–002
DE95004501	WHC-SD-WM-OTP–167
DE95004502	WHC-SD-WM-TI–666
DE95004503	WHC-SD-WM-ER–332
DE95004508	WHC-SD-EN-TI–241
DE95004509	ANL/ES/CP–83413
DE95004510	WHC-SD-WM-ATP–093
DE95004512	WHC-SD-EN-TI–292
DE95004514	DOE/ET/53088–670
DE95004515	DOE/ET/53088–685
DE95004516	DOE/FE/62803–T1
DE95004519	SAND–94-2056C
DE95004520	SAND–94-2922C
DE95004527	SAND–94-1718C
DE95004531	SAND–94-1546C
DE95004532	SAND–94-1570C
DE95004533	SAND–94-2531C
DE95004538	SAND–94-3122C
DE95004539	SAND–94-1563C
DE95004540	SAND–94-1562C
DE95004541	SAND–94-2944C
DE95004542	SAND–94-2709C
DE95004543	SAND–94-2831C
DE95004544	SAND–94-1392C
DE95004545	SAND–94-1990C

Order No.	Report No.
DE95004546	SAND–94-1810C
DE95004547	PNL-SA–24024
DE95004548	PNL-SA–24935
DE95004549	SAND–94-2731
DE95004552	SAND–94-3047C
DE95004553	SAND–94-2064C
DE95004554	SAND–94-3062C
DE95004555	SAND–94-1692C
DE95004556	PNL-SA–24417
DE95004557	PNL-SA–21635
DE95004558	PNL-SA–24344
DE95004559	PNL-SA–24027
DE95004560	PNL-SA–24672
DE95004561	PNL-SA–21497
DE95004562	PNL-SA–21776
DE95004563	PNL-SA–22048
DE95004564	PNL-SA–24144
DE95004565	PNL-SA–25145
DE95004566	PNL-SA–25339
DE95004567	PNL-SA–24176
DE95004568	PNL-SA–24367
DE95004569	PNL-SA–19604
DE95004570	PNL-SA–24010
DE95004571	PNL-SA–24009
DE95004572	PNL-SA–23839
DE95004573	PNL-SA–24129
DE95004575	PNL-SA–25192
DE95004576	PNL-SA–24552
DE95004577	PNL-SA–24553
DE95004578	PNL-SA–23723
DE95004579	PNL-SA–24394
DE95004581	FNAL/C–94/293-E
DE95004582	ANL/TD/CP–85125
DE95004584	ANL/TD/CP–85108
DE95004585	ANL/TD/CP–85107
DE95004586	ANL/TD/CP–85106
DE95004589	ANL/RE/PP–80379
DE95004590	ANL/CMT/CP–83639
DE95004591	ANL/DIS/CP–84377
DE95004592	ANL-HEP-CP–94-78
DE95004593	ANL-HEP-CP–94-75
DE95004594	ANL-HEP-CP–94-76
DE95004595	ANL/MSD/CP–84768
DE95004596	ANL/ASD/CP–84555
DE95004597	ANL/PHY/CP–84104
DE95004598	ANL/RE/PP–80322
DE95004599	ANL/DIS/CP–84531
DE95004600	ANL/DIS/CP–84533
DE95004602	ANL/CHM/CP–84071
DE95004604	ANL/ET/CP–82120
DE95004605	ANL/ET/CP–84563
DE95004609	ANL/PHY/CP–84545
DE95004610	ANL/PHY/CP–84543
DE95004611	ANL/MSD/CP–82573
DE95004613	ANL/ET/CP–82008
DE95004614	ANL/CHM/CP–84392
DE95004615	ANL/MSD/CP–84413
DE95004616	ANL/ASD/CP–83682
DE95004617	ANL/ES/CP–84328
DE95004619	ANL/EP/SUMM–84775
DE95004620	ANL/EP/VU–84785
DE95004621	DOE/ER/40246–9
DE95004622	DOE/ER/40128–T8
DE95004623	DOE/ER/40128–T9
DE95004624	DOE/ER/40128–T10
DE95004625	ANL-HEP-PR–94-79
DE95004626	ANL/EP/SUMM–84774
DE95004627	ANL/ET/CP–84844
DE95004628	ANL/ET/CP–84795
DE95004629	ANL/MSD/PP–82718
DE95004631	ANL/ET/CP–83901
DE95004632	ANL/CMT/CP–83329
DE95004633	ANL/MSD/PP–83083
DE95004635	ANL/DIS/CP–84908
DE95004636	ANL-HEP-CP–94-82
DE95004637	ANL/EP/VU–84771
DE95004638	ANL-HEP-TR–94-87
DE95004639	ANL/ET/CP–84861
DE95004641	ANL/DIS/PP–83052
DE95004642	ANL/CMB/PP–84252
DE95004643	ANL/MCS/CP–85098
DE95004644	ANL/CMT/PP–82412
DE95004645	ANL/CMT/CP–82874
DE95004646	ANL/MSD/CP–84398
DE95004647	ANL/MSD/CP–82826
DE95004649	ANL/MSD/PP–83268
DE95004650	ANL/EA/CP–84292
DE95004652	ANL/EWM/CP–83384
DE95004653	ANL/MSD/CP–83452
DE95004655	ANL/MSD/CP–83568
DE95004656	ANL/XFD/CP–82917
DE95004657	ANL/ET/PP–80280
DE95004658	ANL/PHY/CP–84618
DE95004659	ANL/ET/CP–82012
DE95004660	ANL/ET/CP–84649
DE95004663	ANL-HEP-TR–94-42
DE95004667	ITER-TN-BL–5-0-3
DE95004668	LBL–36343
DE95004669	LBL–36302
DE95004670	LBL–36175
DE95004671	LBL–36287
DE95004672	LBL–36208
DE95004673	LBL–36233
DE95004674	LBL-PUB–3095-Rev.1
DE95004675	LBL–34244-Rev.
DE95004676	LBL–34638
DE95004677	LBL–36050
DE95004678	LBL–36273
DE95004679	LBL–35635
DE95004680	LBL–36293
DE95004682	LBL–36383
DE95004683	LBL–36180
DE95004684	LBL–36126
DE95004685	LBL–35238
DE95004686	LBL–34612
DE95004687	LBL–35179
DE95004689	LBL–36024
DE95004690	LBL–36055
DE95004691	LBL–36353
DE95004692	SAND–94-2568
DE95004694	DOE/ER/03064–T2
DE95004695	DOE/ER/03064–T3
DE95004696	DOE/ER/03064–T4
DE95004697	DOE/ER/03064–T5
DE95004699	DOE/ER/75671–T1
DE95004702	DOE/ER/14081–T3
DE95004703	DOE/CE/15544–T9
DE95004704	DOE/CE/15558–T3
DE95004705	DOE/CE/90043–T1
DE95004709	DOE/CE/26592–2
DE95004724	FEMP–95004724
DE95004726	SAND–94-2163
DE95004727	SAND–94-2170C
DE95004728	SAND–93-2122
DE95004729	SAND–94-3077C
DE95004730	ORNL/ER–264
DE95004731	ORNL/ER–169/S4
DE95004732	ES/ER/TM–85/R1
DE95004733	ORNL/ER–169/S3
DE95004734	ORNL/TM–12828
DE95004735	ES/ER/TM–33/R1
DE95004736	ORNL/ER/Sub–87-99053/28
DE95004737	ORNL/Sub–87-SA946C/04
DE95004738	ORNL/TM–12868
DE95004739	ES/ER/TM–113
DE95004740	DOE/OR–01-1311-D2
DE95004741	DOE/OR–1047-D2
DE95004742	DOE/OR–01-1258-D2
DE95004743	ORNL/CDIAC–74
DE95004744	ES/ER/TM–123
DE95004745	DOE/OR–01-1290-D1
DE95004747	WHC-SD-WM-TA–156
DE95004748	WHC-SD-TD-CSWD–002
DE95004749	WHC-SD-W151-ANAL–001
DE95004750	WHC-SD-SQA-CSA–20381
DE95004751	WHC-SD-WM-OTP–168
DE95004752	WHC-SD-WM-DA–144
DE95004753	WHC-SD-NR-CSER–014-Rev.1
DE95004754	WHC-SD-W337-ATP–001
DE95004755	WHC-SD-WM-SARR–012-Rev.1
DE95004756	WHC-SD-PRP-HA–014
DE95004757	SAND–94-3190C
DE95004758	SAND–94-1403C
DE95004759	SAND–94-1402C
DE95004761	DOE/ER/40561–164
DE95004762	DOE/ER/40561–172
DE95004763	DOE/ER/40561–173
DE95004764	DOE/ER/40561–174
DE95004765	SAND–94-3147C
DE95004766	SAND–94-1653C
DE95004769	SAND–94-2763C
DE95004772	SAND–94-3093C
DE95004778	SAND–94-2617C
DE95004779	SAND–94-1597C
DE95004780	SAND–94-1557C
DE95004781	SAND–94-1571C
DE95004782	SAND–94-3078C
DE95004783	ORNL–6818
DE95004784	ORNL/TM–12708
DE95004785	WHC-SD-W340-ES–002
DE95004786	WHC-SD-L225-ATP–001
DE95004787	WHC-SA–2731
DE95004788	WHC-SD-SNF-PTR–001
DE95004789	WHC-SD-WM-ER–349
DE95004790	WHC-SD-WM-ER–352
DE95004791	ORNL/TM–12744
DE95004792	ORNL/TM–12855
DE95004793	FNAL/C–94/252-E
DE95004794	ORAU–94/F-29
DE95004795	ORAU–94/D-58
DE95004796	ORAU–94/F-10
DE95004797	ORAU–94/G-111
DE95004798	ORAU–94/A-24
DE95004799	WSRC-TR–94-054
DE95004800	WSRC-TR–94-0366
DE95004802	WSRC-TR–94-0326
DE95004805	EPD-CTG–94-0037
DE95004806	WSRC-TR–94-0437
DE95004807	WSRC-TR–94-0350
DE95004828	HLW-TEC–940020
DE95004829	WSRC-TR–94-0524
DE95004830	CONF-9401111–1-Rev.1
DE95004831	USGS/OFR–94-303
DE95004832	DOE/NASA–0329-2
DE95004833	ORNL/PPA–94/4
DE95004834	BNL–61083
DE95004835	BNL–61074
DE95004836	SR/OOG–94-03
DE95004837	BNL-NUREG–61147
DE95004838	BNL–61099
DE95004839	BNL–60978
DE95004840	BNL–61141
DE95004841	BNL–61053
DE95004842	BNL–61082

Order No.	Report No.
DE95004843	BNL–60818
DE95004844	BNL–61084
DE95004848	FNAL/C–94/379-E
DE95004849	FNAL/C–94/397
DE95004850	FNAL/C–94/209-E
DE95004851	FNAL/C–94/404-E
DE95004852	FNAL/C–94/144-E
DE95004853	FNAL/C–94/368-E
DE95004854	FNAL/C–94/307
DE95004855	FNAL/C–94/337-E
DE95004856	BNL–52435
DE95004858	DOE/OR/22160–T14
DE95004859	DOE/OR/22160–T15
DE95004860	DOE/OR/21981–T4
DE95004861	DOE/OR/21981–T5
DE95004863	LA–12884
DE95004864	LA–12885
DE95004866	DOE/RL–93-78
DE95004867	DOE/RL–93-43
DE95004868	DOE/RL–93-98
DE95004870	GA-A–21872
DE95004871	DOE/RL–94-54
DE95004874	ES/ER/TM–102/R1
DE95004875	ORNL/TM–12886
DE95004876	ORNL/TM–12852
DE95004877	ES/ER/TM–76
DE95004878	ORNL/TM–12849
DE95004879	ES/ER/TM–126
DE95004880	ES/ER/TM–125
DE95004881	ORNL/M–3077
DE95004882	DOE/S–0069-Vol.1
DE95004883	DOE/S–0069-Vol.2
DE95004884	DOE/BP/97298–2
DE95004885	DOE/BP/22493–8
DE95004886	DOE/EA–0939
DE95004887	DOE/BP–2458
DE95004888	DOE/BP–2457
DE95004889	DOE/BP/91964–3
DE95004891	DOE/BP–1953
DE95004893	DOE/BP/01385–2
DE95004894	DOE/BP–1958
DE95004896	PNL-SA–25345
DE95004898	PNL-SA–24072
DE95004900	PNL-SA–23718
DE95004907	PNL-SA–25425
DE95004909	PNL-SA–25031
DE95004926	PNL-SA–24698
DE95004928	PNL-SA–23824
DE95004936	PNL-SA–24741
DE95004937	PNL-SA–25050
DE95004938	PNL-SA–21810
DE95004940	PNL-SA–23775
DE95004942	PNL-SA–24557
DE95004943	FEMP–2394
DE95004945	FEMP–2396
DE95004948	PNL–10258
DE95004949	DOE/RL–94-46
DE95004950	BNL–61127
DE95004951	BNL–61136
DE95004952	BNL–61142
DE95004953	BNL–61139
DE95004954	BNL–61079
DE95004957	PNL-SA–23952
DE95004958	SAND–94-2533
DE95004962	GA-A–21834
DE95004966	UCRL-JC–116575
DE95004970	WHC-SP–1118
DE95004976	WHC-SP–1108
DE95004977	WHC-SD-WM-TP–206
DE95004978	WHC-SD-WM-TP–293
DE95005000	EGG-M–94185
DE95005001	ORNL–6828
DE95005003	BNL–61006
DE95005004	BNL–60999
DE95005008	WSRC-TR–94-100-6
DE95005011	WSRC-TR–94-0221
DE95005012	WSRC-TR–94-0224-Rev.1
DE95005014	WSRC-TR–94-100-8
DE95005045	DOE/ID–10437(93)
DE95005047	GRI–93/0229
DE95005048	ANL/MCS-TM–198
DE95005051	WHC-SD-WM-TI–680
DE95005052	WHC-SD-WM-TA–154
DE95005054	WHC-EP–0532-Rev.2
DE95005055	WHC-EP–0813
DE95005056	WHC-EP–0829
DE95005057	WHC-SD-WM-DP–080
DE95005058	CONF-9407153–Vol.1
DE95005059	CONF-9407153–Vol.2
DE95005067	CONF-9410141–6
DE95005068	WHC-SD-TD-ICD–001
DE95005077	WHC-SD-WM-TI–386
DE95005110	DOE/ER/40880–1
DE95005111	DOE/NV/10845–50
DE95005114	DOE/MC/28162–3951
DE95005115	DOE/R6/99203–T8
DE95005119	DOE/R5/51901–T4
DE95005173	DOE/PC/93054–4
DE95005174	DOE/PC/93223–T3
DE95005175	DOE/PC/91056–T7
DE95005176	DOE/PC/91055–T9
DE95005181	DOE/PC/92246–T6
DE95005182	DOE/PC/91303–T13
DE95005183	DOE/PC/93221–T4
DE95005184	DOE/PC/91311–T12
DE95005185	DOE/PC/90042–T10
DE95005186	DOE/PC/92532–T9
DE95005187	DOE/PC/92542–T8
DE95005188	DOE/PC/93213–T4
DE95005189	DOE/PC/91054–T12
DE95005191	DOE/PC/92111–T7
DE95005193	DOE/MT/92019–T2
DE95005194	DOE/PC/93226–T4
DE95005196	DOE/PC/91281–T12
DE95005198	DOE/PC/91308–12
DE95005199	DOE/PC/93225–4
DE95005200	DOE/PC/93202–4
DE95005201	DOE/PC/92550–8
DE95005202	DOE/PC/91293–12
DE95005203	DOE/PC/92528–7
DE95005204	DOE/PC/79819–12
DE95005205	DOE/PC/92147–7
DE95005206	DOE/PC/92545–8
DE95005210	LA-UR–94-4203
DE95005212	LA-UR–94-4196
DE95005213	LA-UR–94-4179
DE95005239	LA-UR–94-4386
DE95005241	LA-UR–94-4382
DE95005244	LA-UR–94-4371
DE95005245	LA-UR–94-4365
DE95005250	LA-UR–94-4343
DE95005251	LA-UR–94-4339
DE95005252	LA-UR–94-4333
DE95005253	LA-UR–94-4318
DE95005279	LA-UR–94-4168
DE95005283	WHC-SD-WM-DP–075
DE95005284	WHC-SD-W337-OTP–001
DE95005286	WHC-SD-FF-DRR–00018
DE95005288	WHC-SD-T100-PMP–001
DE95005293	WHC-SD-WM-ATR–082
DE95005299	WHC-SD-WM-SOIL–001
DE95005303	DOE/PC/90044–10
DE95005305	DOE/EH–231-054/1294
DE95005306	DOE/MT/94011–1
DE95005313	DOE/MT/92020–8
DE95005314	DOE/BC/14984–1
DE95005315	DOE/BC/14970–1
DE95005318	DOE/BC/14977–1
DE95005319	DOE/BC/14977–2
DE95005322	DOE/BC/14958–T2
DE95005326	DOE/BC/14875–5
DE95005327	DOE/BC/14477–16
DE95005328	DOE/BC/14477–17
DE95005330	DOE/BC/14951–8
DE95005332	DOE/BC/14860–8
DE95005333	DOE/BC/14861–5
DE95005334	DOE/BC/14896–4
DE95005338	DOE/BC/14862–7
DE95005339	DOE/BC/14891–4
DE95005340	DOE/BC/14882–9
DE95005341	DOE/BC/14983–2
DE95005344	DOE/BC/14831–12
DE95005346	DOE/BC/14881–9
DE95005349	DOE/BC/14986–2
DE95005351	EGD-CERCLA–002/0790
DE95005355	DOE/BC/14990–1
DE95005357	DOE/BC/14893–4
DE95005358	DOE/BC/14884–9
DE95005359	DOE/BC/14884–10
DE95005360	DOE/BC/14954–8
DE95005364	DOE/EIA–0487(93)
DE95005365	DOE/EIA–0437(93)/1
DE95005366	DOE/EIA–0538(94/95-14)
DE95005367	DOE/BC/14960–6
DE95005368	DOE/BC/14963–4
DE95005369	DOE/BC/14963–6
DE95005370	DOE/BC/14883–8
DE95005371	DOE/BC/14883–9
DE95005374	DOE/MT/92018–8
DE95005378	DOE/MT/93007–4
DE95005380	DOE/MT/92008–9
DE95005382	DOE/MT/93005–4
DE95005383	DOE/MT/92009–9
DE95005410	ANL/MCS-TM–186
DE95005414	SAND–94-3070C
DE95005423	SAND–94-1613C
DE95005429	WHC-SD-WM-ER–391
DE95005430	WHC-SD-WM-ES–316
DE95005443	SAND–94-2257
DE95005445	DOE/EIA–0585(93)
DE95005451	DOE/CE/23810–48
DE95005454	DOE/ER/60934–T2
DE95005455	DOE/ER/60934–T1
DE95005456	DOE/CE/21009–T1
DE95005458	DOE/SF/19090–T3
DE95005461	WHC-SA–1769
DE95005462	WHC-SD-LEF-TS–001
DE95005464	WHC-SD-TD-CR–001
DE95005468	DOE/PC/89663–T14
DE95005469	WHC-SD-WM-SDR–008
DE95005471	ANL/APS/TB–20
DE95005477	WHC-EP–0839
DE95005495	DOE/ER/25199–T1
DE95005503	DOE/PC/90314–T1
DE95005504	DOE/PC/90314–T2
DE95005505	DOE/PC/90314–T3
DE95005506	DOE/PC/90314–T4
DE95005507	DOE/PC/90314–T5
DE95005508	DOE/PC/90314–T6
DE95005509	DOE/PC/90314–T7
DE95005510	DOE/PC/90314–T8
DE95005511	DOE/PC/90314–T9
DE95005512	DOE/ER/60743–T1
DE95005513	DOE/ER/60743–T2
DE95005514	DOE/ER/60743–T3
DE95005518	DOE/PC/90057–T10

Order No.	Report No.
DE95005519	DOE/PC/90057–T11
DE95005521	DOE/PC/91029–T3
DE95005522	DOE/PC/90548–T14
DE95005523	DOE/PC/90548–T15
DE95005540	PPPL-CFP–3185
DE95005545	DOE/ER/13426–T4
DE95005551	DOE/PC/92246–T7
DE95005554	DOE/PC/94116–T1
DE95005555	DOE/PC/92104–T7
DE95005556	DOE/PC/91338–T8
DE95005557	DOE/PC/89774–T11
DE95005558	DOE/PC/90046–T10
DE95005559	DOE/PC/90046–T11
DE95005560	DOE/PC/91050–T9
DE95005562	DOE/PC/93256–T4
DE95005563	DOE/PC/93256–T5
DE95005564	DOE/PC/92521–T193
DE95005610	DOE/EIA–0380(95/01)
DE95005611	DOE/EIA–0226(95/01)
DE95005618	DOE/BP/66088–1
DE95005622	WHC-SD-SNF-SARR–003
DE95005623	WHC-SD-WM-TP–180
DE95005624	WHC-SD-WM-VI–014
DE95005625	WHC-SD-WM-FHA–006
DE95005627	WHC-SD-WM-OTP–171
DE95005629	WHC-SD-EN-PRS–002
DE95005630	WHC-SD-SNF-AP–001
DE95005634	WHC-SD-339-SDR–002-Rev.1
DE95005643	WHC-SD-SNF-EDL–001
DE95005645	WHC-SD-SNF-TA–002
DE95005646	WHC-SD-SNF-TA–003
DE95005650	WHC-SD-W007H-ATR–001
DE95005651	LA–12889
DE95005652	LA–12863
DE95005653	BNL–52443
DE95005654	BNL–52450
DE95005655	UCRL-LR–114070-7
DE95005656	DOE/ER–0635
DE95005657	DOE/ER–0636
DE95005658	UCRL-ID–118009
DE95005659	UCRL-ID–119479
DE95005660	UCRL-ID–119551
DE95005665	DOE/ER/25052–4
DE95005666	DOE/CE/23810–48C
DE95005667	DOE/NV/10845–42
DE95005668	DOE/ER/13676–7
DE95005669	DOE/EIA–0540(93)
DE95005670	DOE/EIA–0538(94/95-15)
DE95005702	DOE/PC/91027–1
DE95005703	DOE/PC/91027–2
DE95005704	DOE/PC/91027–3
DE95005705	DOE/PC/91027–4
DE95005706	DOE/PC/91027–5
DE95005707	DOE/PC/91027–6
DE95005708	DOE/PC/91027–7
DE95005709	DOE/PC/91027–8
DE95005717	PNL–9410-4
DE95005736	ORNL/ER–286
DE95005740	LA–12898-MS
DE95005741	DOE/ER/13621–T2
DE95005742	LA–12753-MS
DE95005743	LA–12752-MS
DE95005744	LA–12857-ENV
DE95005751	PNL–10222
DE95005752	PNL–10194
DE95005753	PNL–10286
DE95005754	PNL–10134
DE95005755	PNL–10382
DE95005763	DOE/PC/94116–T2
DE95005766	DOE/PC/90365–T16
DE95005767	DOE/PC/90308–T2
DE95005768	DOE/PC/91039–T11
DE95005769	DOE/PC/92206–T7
DE95005770	DOE/PC/91288–T14
DE95005776	DOE/SR/18445–T1
DE95005782	DOE/ER/75642–T2
DE95005785	DOE/ER/13621–T1
DE95005786	DOE/EW/50625–T21
DE95005790	DOE/EIA–0520(95/01)
DE95005791	DOE/EIA–0035(95/01)
DE95005796	DOE/ER/45427–5
DE95005798	DOE/ER/60617–6
DE95005799	DOE/ER/60617–7
DE95005800	DOE/ER/60617–8
DE95005803	DOE/BC/14654–T6
DE95005805	DOE/BC/14654–T8
DE95005806	DOE/BC/14654–T9
DE95005808	DOE/ER/61137–T3
DE95005810	DOE/CE/26610–T1
DE95005812	DOE/ER/61400–T1
DE95005816	DOE/ER/60355–T3
DE95005831	ANL/CHM/PP–82180
DE95005835	ANL/BIM/PP–78964
DE95005839	ANL-HEP-CP–94-68
DE95005841	ANL/PHY/CP–84452
DE95005865	ANL/EA/CP–82216
DE95005880	ANL–94/33
DE95005881	WSRC-RP–94-1272
DE95005882	DOE/OR–01-1292-D2
DE95005885	WSRC-MS–94-0203P
DE95005888	WSRC-MS–94-0608
DE95005889	WSRC-TR–94-0311
DE95005890	WSRC-TR–94-0495
DE95005891	WSRC-TR–94-0493
DE95005892	WSRC-TR–94-0490
DE95005894	CONF-9410165–10
DE95005895	CONF-941144–53
DE95005896	CONF-950110–17
DE95005897	CONF-941016–5
DE95005898	CONF-940903–1
DE95005905	DOE/ER/40150–281
DE95005906	ANL/MCS-TM–200
DE95005909	ORNL/TM–12875
DE95005911	SAND–95-0067
DE95005913	SAND–94-3252
DE95005914	LA–12909-MS
DE95005915	LA–12814-MS
DE95005919	UCRL-JC–118634
DE95005923	ORNL–6821
DE95005924	DOE/ER/40291–22
DE95005925	DOE/ER/40291–23
DE95005926	DOE/ER/40291–24
DE95005927	DOE/ER/40291–25
DE95005928	DOE/ER/40291–26
DE95005929	CONF-931077–1
DE95005931	BNL-A–3259
DE95005934	BNL–61179
DE95005938	SLAC-PUB–6290
DE95005940	SLAC-PUB–6338
DE95005942	SLAC-PUB–6527
DE95005943	SLAC-PUB–6549
DE95005944	SLAC-PUB–6550
DE95005945	SLAC-PUB–6584
DE95005946	SLAC-PUB–6591
DE95005947	SLAC-PUB–6597
DE95005948	SLAC-PUB–6598
DE95005949	SLAC-PUB–6599
DE95005950	SLAC-PUB–6600
DE95005958	BNL–61272
DE95005963	CONF-941088–1
DE95005971	WSRC-TR–94-0494
DE95005973	UCRL-CR–117355
DE95005974	ORNL/TM–12474
DE95005975	WHC-SD-WM-ANAL–039
DE95005976	WHC-SD-WM-TP–298
DE95005980	WHC-SD-WM-OTP–170
DE95005982	WHC-EP–0832
DE95005986	WHC-SD-WM-OTR–170
DE95005987	WHC-SD-WM-TRP–229
DE95005988	WHC-SD-WM-DP–073
DE95005989	WHC-SD-WM-ATP–113
DE95005990	WHC-SD-WM-WP–218-Rev.1
DE95005991	WHC-SD-WM-ANAL–040
DE95005992	ORNL/GWPO–012
DE95005994	UCRL-CR–116651
DE95005995	USGS-OFR–92-657
DE95005996	ES/ER/TM–96/R1
DE95005997	ORNL/TM–12823
DE95005999	BNL–61230
DE95006051	SLAC-PUB–6602
DE95006052	SLAC-PUB–6604
DE95006053	SLAC-PUB–6617
DE95006054	SLAC-PUB–6621
DE95006055	SLAC-PUB–6625
DE95006056	SLAC-PUB–6639
DE95006057	SLAC-PUB–6640
DE95006058	SLAC-PUB–6645
DE95006059	SLAC-PUB–6646
DE95006060	SLAC-PUB–6647
DE95006061	SLAC-PUB–6653
DE95006062	SLAC-PUB–6658
DE95006063	SLAC-PUB–6659
DE95006064	SLAC-PUB–6662
DE95006065	SLAC-PUB–6669
DE95006066	SLAC-PUB–6673
DE95006067	SLAC-PUB–6674
DE95006068	SLAC-PUB–6701
DE95006069	SLAC-PUB–6702
DE95006070	SLAC-PUB–6718
DE95006071	SLAC-PUB–6730
DE95006072	SLAC-PUB–6731
DE95006073	SLAC-PUB–6735
DE95006074	LA–12831-MS
DE95006075	ANL–94/39
DE95006078	ANL/DIS/TM–21
DE95006079	DOE/EIA–M062/2
DE95006080	DOE/EIA–M069/A
DE95006081	DOE/EIA–M059/A
DE95006089	DOE/MC/26366–3962
DE95006092	DOE/MC/26288–3961
DE95006093	SLAC-PUB–6566
DE95006097	BNL–61267
DE95006103	PATENTS-US–A7980892
DE95006104	PATENTS-US–A7980888
DE95006105	PATENTS-US–A7979672
DE95006108	PATENTS-US–A7972820
DE95006109	PATENTS-US–A7971111
DE95006111	PATENTS-US–A7970883
DE95006112	PATENTS-US–A7999339
DE95006113	PATENTS-US–A7999338
DE95006114	PATENTS-US–A7993553
DE95006116	PATENTS-US–A7989609
DE95006117	PATENTS-US–A7988598
DE95006118	PATENTS-US–A7986828
DE95006119	PATENTS-US–A7984598
DE95006120	PATENTS-US–A7983350
DE95006121	PATENTS-US–A7983188
DE95006122	PATENTS-US–A7981636
DE95006123	PATENTS-US–A7981450
DE95006124	PATENTS-US–A7980894
DE95006135	PATENTS-US–A7967482
DE95006136	PATENTS-US–A7967481
DE95006138	PATENTS-US–A7967463
DE95006139	PATENTS-US–A7966925

Order No.	Report No.
DE95006140	PATENTS-US--A7966644
DE95006144	ORNL/TM--12853
DE95006145	SLAC-PUB--6648
DE95006146	ANL/ER--3
DE95006147	DOE/MC/27205--3963
DE95006148	ANL/FPP/TM--275
DE95006149	SLAC--450
DE95006150	DOE/EH--0447
DE95006151	SLAC-PUB--6685
DE95006152	DOE/MC/26006--3960
DE95006153	DOE/MC/28245--3922
DE95006154	DOE/MC/27205--3964
DE95006160	DOE/MC/30012--3980
DE95006167	UCRL-JC--118082
DE95006170	LA-UR--95-440
DE95006183	DOE/EIA--0586
DE95006188	PPPL--3045
DE95006189	PPPL--3044
DE95006190	PPPL--3040
DE95006191	PNL--10365
DE95006193	PNL--10398-Vol.1
DE95006194	PNL--10398-Vol.2
DE95006195	SAND--94-8237
DE95006196	SAND--94-8251
DE95006198	SAND--94-8780
DE95006199	SAND--95-8002
DE95006200	SAND--95-8007
DE95006205	DOE/PC/92527--T8
DE95006206	DOE/PC/92190--T6
DE95006207	DOE/PC/91344--T10
DE95006208	DOE/MC/29109--3979
DE95006212	SLAC-PUB--95-6745
DE95006213	SLAC-PUB--6700
DE95006214	SLAC-PUB--6694
DE95006215	SLAC-PUB--6567
DE95006217	DOE/MC/29109--3978
DE95006218	DOE/MC/29109--3977
DE95006221	DOE/MC/29444--3984
DE95006228	PPPL--3034
DE95006229	PPPL--3036
DE95006230	PPPL--3033
DE95006231	PPPL--3032
DE95006232	PPPL--3031
DE95006233	PPPL--3030
DE95006234	PPPL--3029
DE95006235	PPPL--3027
DE95006236	PPPL--3026
DE95006238	PPPL--2999
DE95006240	DOE/PC/92251--T7
DE95006241	DOE/PC/94214--T1
DE95006242	DOE/PC/94207--T1
DE95006243	DOE/PC/94211--T1
DE95006244	DOE/PC/93203--T4
DE95006246	DOE/PC/94227--T1
DE95006248	DOE/PC/90287--T15
DE95006253	DOE/NV/10845--49
DE95006254	DOE/NV/10845--T20
DE95006255	DOE/CE/15613--T3
DE95006256	DOE/ER/61364--3
DE95006257	DOE/NV/10384--28
DE95006311	SAND--95-0108C
DE95006312	DOE/EH--95006312
DE95006313	SAND--94-3183C
DE95006319	SAND--94-2206C
DE95006320	SAND--94-1703C
DE95006321	SAND--94-1693C
DE95006356	LA--12866
DE95006364	DOE/EH--0445
DE95006365	DOE/ER--0591-Suppl.
DE95006366	DOE/ER--0638
DE95006368	PNL--10283
DE95006370	PNL--10415
DE95006372	PPPL--3025
DE95006373	PPPL--3042
DE95006374	PPPL--3038
DE95006375	BNL--52351-Rev.12/94
DE95006376	DOE/ED--0006
DE95006377	UCRL--52000-94-10
DE95006378	DOE/AL/65030--9413
DE95006379	UCRL-ID--119235
DE95006488	PNL--10387
DE95006717	LBL--36379
DE95006718	LBL--35912
DE95006719	LBL--36211
DE95006720	LBL--35982
DE95006721	LBL--36395
DE95006722	LBL--36385
DE95006723	LBL--36614
DE95006724	LBL--36467
DE95006725	LBL--34468
DE95006726	LBL--36387
DE95006727	LBL--36212
DE95006728	BNL--52444
DE95006729	BNL--52452
DE95006730	LBL--35768
DE95006731	DOE/RL--91-50-Rev.1
DE95006851	DOE-HDBK--1074-95
DE95006852	ANL/FPP/TM--273
DE95006853	SAND--94-8238
DE95006854	ANL/ESD--26
DE95006855	DOE/DP--0130
DE95006873	SEAB--95006873
DE95007015	PNL--10121
DE95007016	DOE/ER/53198--253
DE95007017	DOE/ER/53198--254
DE95007018	DOE/ER/53212--255
DE95007019	ANL/FPP/TM--272
DE95007021	DOE/EE--0025
DE95007104	DOE/CR--0032
DE95060074	WSRC-RP--94-522
DE95060075	WSRC-TR--94-0509
DE95060076	WSRC-TR--93-301-Rev.3
DE95060077	WSRC-TR--94-0539
DE95060078	WSRC-RP--94-01140
DE95060080	WSRC-RP--94-584
DE95060081	WSRC-RP--94-585
DE95060082	WSRC-MS--94-0632
DE95060083	WSRC-MS--95-0012
DE95060084	WSRC-MS--95-0013
DE95060085	WSRC-TR--95-0014
DE95060086	WSRC-MS--95-0025
DE95060087	WSRC-MS--95-0028
DE95060088	WSRC-MS--94-0453
DE95611717	INIS-mf--14440
DE95611718	JINR-D--15-93-80
DE95611763	CNIC--00766
DE95611775	KAERI/RR--1231/92
DE95611776	KAERI/RR--1241/93
DE95611777	KAERI/RR--1264/93
DE95611797	SKB-TR--94-10
DE95611876	KAERI/RR--1322/94
DE95611878	INIS-mf--13801
DE95611879	STUDSVIK-M--94-86
DE95611881	CNIC--00793
DE95612007	KAERI/RR--1381/93
DE95612016	FRCEA-TH--412
DE95612017	IAEA-TECDOC--765
DE95612019	KAERI/RR--1343/93
DE95612020	KAERI/RR--1346/93
DE95612021	KAERI/RR--1360/93
DE95612035	CEA-R--5572
DE95612247	KAERI/RR--1355/93
DE95612250	LUTKDH-TKOO--1015
DE95612386	INIS-mf--14415
DE95612388	NEI-SE--180
DE95612389	PSI--94-21
DE95612398	BHR--80
DE95612415	IC--94/238
DE95612416	IC--94/283
DE95612417	INIS-mf--14436
DE95612428	STUDSVIK-ES--94-32
DE95612434	INIS-mf--14416
DE95612435	RPII--94/3
DE95612478	KAERI/RR--1385/93
DE95612485	KAERI/RR--1352/93
DE95612492	CNIC--00796
DE95612521	KAERI/RR--1324/94
DE95612522	SLU-REK-R--73
DE95612523	SLU-REK-R--75
DE95612529	KAERI/RR--1251/93
DE95612538	KAERI/RR--1227/92
DE95612539	KAERI/RR--1321/93
DE95612542	CNIC--00798
DE95612549	KAERI/RR--1253/93
DE95612553	KAERI/RR--1310/94
DE95612554	KAERI/RR--1383/93
DE95612557	CNIC--00774
DE95612558	KAERI/RR--1320/94
DE95612559	KAERI/RR--1328/93
DE95612567	KAERI/RR--1195/92
DE95612568	KAERI/RR--1221/92
DE95612569	KAERI/RR--1308/93
DE95612570	KAERI/RR--1315/93
DE95612595	IFP--41456
DE95612629	KAERI/RR--1318/93
DE95612651	KAERI/RR--1142/92
DE95612652	KAERI/RR--1259/93
DE95612653	KAERI/RR--1319/94
DE95612654	KAERI/RR--1248/93
DE95612655	KAERI/RR--1362/93
DE95612664	KAERI/RR--1292/93
DE95612665	KAERI/RR--1366/93
DE95612667	FRCEA-TH--411
DE95612668	KAERI/RR--1206/92
DE95612681	KAERI/RR--1236/92
DE95612682	KAERI/RR--1256/93
DE95612683	KAERI/RR--1271/94
DE95612684	KAERI/RR--1299/93
DE95612685	KAERI/RR--1312/94
DE95612686	KAERI/RR--1337/93
DE95612687	KAERI/RR--1350/93
DE95612704	KAERI/RR--1384/93
DE95612718	FRCEA-TH--409
DE95612720	JINR-R--9-94-261
DE95612722	KAERI/RR--1213/92
DE95612745	JINR-R--13-94-213
DE95612752	IFVE-OMVT--92-123
DE95612753	JINR-E--9-94-255
DE95612754	KAERI/RR--1282/93
DE95612760	JINR-E--9-94-236
DE95612782	KAERI/RR--1255/93
DE95612783	KAERI/RR--1272/93
DE95612784	KAERI/RR--1336/93
DE95612787	KAERI/RR--1323/93
DE95612790	FEI--2298
DE95612791	KAERI/RR--1265/93
DE95612796	FEI--2231
DE95612797	KAERI/RR--1267/93
DE95612798	KAERI/RR--1283/93
DE95612799	KAERI/RR--1293/93
DE95612800	KAERI/RR--1307/93
DE95612810	FEI--2217
DE95612811	FEI--2238
DE95612812	FEI--2240
DE95612813	KAERI/RR--1247/93
DE95612819	EUROSIM--94-10

Order No.	Report No.
DE95612820	KAERI/RR–1192/92
DE95612821	KAERI/RR–1338/93
DE95612832	INIS-mf–14434
DE95612847	CNIC–00769
DE95612848	KAERI/RR–1222/93
DE95612849	KAERI/RR–1224/93
DE95612850	KAERI/RR–1239/92
DE95612851	KAERI/RR–1240/92
DE95612852	KAERI/RR–1263/93
DE95612853	KAERI/RR–1266/93
DE95612854	KAERI/RR–1270/93
DE95612855	KAERI/RR–1295/93
DE95612856	KAERI/RR–1296/93
DE95612857	KAERI/RR–1303/93
DE95612858	KAERI/RR–1314/93
DE95612859	KAERI/RR–1316/93
DE95612923	KAERI/RR–1311/93
DE95612924	KAERI/RR–1317/93
DE95612925	KAERI/RR–1326/93
DE95612926	KAERI/RR–1332/93
DE95612927	KAERI/RR–1344/93
DE95612928	KAERI/RR–1345/93
DE95612929	KAERI/RR–1377/93
DE95612931	KAERI/RR–1228/92
DE95612932	KAERI/RR–1378/93
DE95612942	JINR-E–3-94-227
DE95612943	KAERI/RR–1286/93
DE95612944	KAERI/RR–1354/93
DE95612945	KAERI/RR–1357/93
DE95612946	KAERI/RR–1372/93
DE95612954	DTU-AEF-NT–11
DE95612955	FEI–2271
DE95612956	KAERI/RR–1340/93
DE95612957	KAERI/RR–1341/93
DE95613002	CNIC–00777
DE95613003	FEI–2293
DE95613004	JINR-E–13-94-283
DE95613005	JINR-E–13-94-284
DE95613006	JINR-R–1-94-239
DE95613007	JINR-R–13-94-267
DE95613008	JINR-R–13-94-276
DE95613009	JINR-R–13-94-277
DE95613010	JINR-R–6-94-272
DE95613011	KAERI/RR–1289/93
DE95613069	CNIC–00786
DE95613070	GANIL-T–94-01
DE95613071	IFVE-OEA–92-109
DE95613072	IFVE-OEF–91-127
DE95613073	IHEP–93-117
DE95613074	JINR-E–13-94-214
DE95613075	JINR-E–13-94-247
DE95613076	JINR-R–13-94-305
DE95613077	JINR-R–13-94-309
DE95613151	IFVE-OEIUNK–92-60
DE95613152	KAERI/RR–1257/93
DE95613153	KAERI/RR–1261/93
DE95613154	KAERI/RR–1349/93
DE95613155	LUNFD6-NFFR–3064
DE95613202	IFVE-OMVT–92-44
DE95613230	INIS-mf–14431
DE95613231	INIS-mf–14432
DE95613232	INIS-mf–14435
DE95613233	NEI-SE–170
DE95613234	SSI–94-07
DE95613235	CNIC–00782
DE95613236	KAERI/RR–1325/93
DE95613248	AEA-D and R–0891(ed.2)
DE95613249	LUTVDG-TVVR–1011
DE95613252	SKB-TR–94-04
DE95613253	SKB-TR–94-08
DE95613254	SKB-TR–94-14
DE95613260	KAERI/RR–1284/93
DE95613273	NEI-SE–172
DE95613277	KAERI/RR–1204/92
DE95613296	INIS-mf–14433
DE95613301	KAERI/RR–1262/93
DE95613311	KAERI/RR–1269/93
DE95613312	KAERI/RR–1178/92
DE95613313	KAERI/RR–1380/93
DE95613318	FRCEA-TH–407
DE95613319	KAERI/RR–1268/93
DE95613320	KAERI/RR–1348/93
DE95613321	KAERI/RR–1287/93
DE95613322	KAERI/RR–1330/93
DE95613323	CNIC–00750
DE95613324	JINR-R–10-94-300
DE95613325	KAERI/RR–1205/92
DE95613326	KAERI/RR–1313/93
DE95613327	KAERI/RR–1331/93
DE95613328	KAERI/RR–1333/93
DE95613329	KAERI/RR–1335/93
DE95613330	KFKI–1994-09/M-N
DE95613331	KTH-ALF-R–94-1
DE95613348	IAEA-TECDOC–770
DE95613349	JINR–94-62
DE95613350	KAERI/RR–1197/92
DE95613351	KAERI/RR–1203/92
DE95613352	KAERI/RR–1288/93
DE95613353	KAERI/RR–1291/93
DE95613354	KAERI/RR–1298/93
DE95613355	KAERI/RR–1300/93
DE95613356	KAERI/RR–1339/93
DE95613357	KAERI/RR–1358/93
DE95613358	LYCEN–9401
DE95613359	NEI-SE–179
DE95613366	JINR-D–2-94-244
DE95613367	JINR-E–2-94-246
DE95613368	JINR-R–2-94-222
DE95613369	JINR-R–2-94-223
DE95613370	BUDKERINP–93-94
DE95613371	IC–93/366
DE95613372	IC–94/188
DE95613373	IC–94/266
DE95613374	IC–94/268
DE95613375	IC–94/279
DE95613376	IC–94/281
DE95613377	IC–94/300
DE95613378	IC–94/314
DE95613379	IC–94/318
DE95613380	IC–94/324
DE95613381	IC–94/332
DE95613382	IC–94/341
DE95613383	IC–94/344
DE95613384	JINR-E–2-94-249
DE95613385	JINR-E–5-94-259
DE95613433	IYaF–93-49
DE95613441	BUDKERINP–94-53
DE95613442	IC–94/273
DE95613443	IC–94/284
DE95613444	IC–94/296
DE95613445	IC–94/298
DE95613446	IC–94/301
DE95613447	IC–94/320
DE95613448	IC–94/330
DE95613449	IC–94/331
DE95613450	KAERI/RR–1234/92
DE95613459	IC–94/240
DE95613460	IC–94/290
DE95613461	JINR-E–2-94-258
DE95613462	JINR-E–2-94-293
DE95613463	JINR-E–2-94-297
DE95613467	IC–94/305
DE95613468	IC–94/307
DE95613469	IC–94/322
DE95613470	IC–94/336
DE95613471	JINR-E–2-94-263
DE95613560	BUDKERINP–93-93
DE95613584	IC–94/289
DE95613585	IC–94/338
DE95613589	IC–94/285
DE95613590	JINR-E–2-94-303
DE95613595	IC–94/277
DE95613596	IC–94/306
DE95613597	JINR-E–2-94-253
DE95613627	JINR-E–2-94-200
DE95613628	JINR-E–2-94-231
DE95613629	JINR-E–2-94-248
DE95613630	JINR-E–2-94-372
DE95613654	IC–94/261
DE95613655	IC–94/302
DE95613656	IC–94/323
DE95613688	IC–94/327
DE95613689	JINR-E–2-94-221
DE95613690	JINR-E–4-94-234
DE95613711	JINR-D–1-94-278
DE95613726	IC–94/225
DE95613727	JINR-E–1-94-294
DE95613728	JINR-E–2-94-262
DE95613760	JINR-E–2-94-254
DE95613765	IC–94/333
DE95613766	JINR-R–4-94-280
DE95613771	IC–94/280
DE95613774	IHEP–93-100
DE95613782	JINR-E–2-94-307
DE95613783	JINR-R–2-94-243
DE95613797	GANIL-T–94-02
DE95613798	IC–94/303
DE95613799	LYCEN-T–9416
DE95613843	BUDKERINP–93-115
DE95613844	BUDKERINP–93-95
DE95613845	BUDKERINP–94-47
DE95613846	FEI–2277
DE95613847	JINR-E–6-94-252
DE95613848	JINR-E–6-94-271
DE95613849	JINR-R–4-94-229
DE95613850	JINR-R–6-94-265
DE95613898	JINR-E–4-94-275
DE95613945	JINR-E–1-94-295
DE95613946	JINR-E–1-94-296
DE95613947	JINR-E–4-94-308
DE95613948	JINR-E–4-94-314
DE95613969	JINR-E–7-94-245
DE95613981	JINR-E–1-94-228
DE95613991	CNIC–00690
DE95613992	JINR-E–1-94-201
DE95613993	JINR-R–1-94-260
DE95613994	JINR-R–1-94-289
DE95614022	JINR-E–1-94-241
DE95614023	JINR-E–1-94-279
DE95614024	JINR-E–1-94-311
DE95614025	JINR-R–1-94-240
DE95614026	JINR-R–1-94-274
DE95614044	IC–94/313
DE95614045	JINR-E–7-94-286
DE95614046	JINR-E–7-94-315
DE95614047	JINR-R–1-94-285
DE95614094	JINR-E–13-94-257
DE95614107	IC–94/295
DE95614120	BUDKERINP–94-56
DE95614122	IC–94/221
DE95614123	IC–94/243
DE95614132	FEI–2257
DE95614164	BUDKERINP–93-64
DE95614166	KTH-ALF-R–94-2
DE95614170	BUDKERINP–93-96
DE95614171	IYaF–93-44

Order No.	Report No.
DE95614172	IYaF–94-63
DE95614173	LRP–504/94
DE95614176	BUDKERINP–94-1
DE95614177	IYaF–94-35
DE95614178	IYaF–94-36
DE95614179	IYaF–94-67
DE95614180	KAERI/RR–1365/93
DE95614186	CNIC–00784
DE95614187	IYaF–94-33
DE95614201	IYaF–93-97
DE95614202	IYaF–93-98
DE95614203	IYaF–94-48
DE95614204	IYaF–94-49
DE95614205	IYaF–94-50
DE95614206	IYaF–94-51
DE95614207	IYaF–94-66
DE95614229	FRCEA-TH–396
DE95614248	LRP–509/94
DE95614252	JINR-E–9-94-237
DE95614255	KAERI/RR–1363/93
DE95614256	KAERI/RR–1364/93
DE95614262	FRCEA-TH–395
DE95614307	IC–94/253
DE95614308	IC–94/286
DE95614309	IC–94/315
DE95614310	IC–94/316
DE95614311	IC–94/326
DE95614351	JINR-E–3-94-291
DE95614352	KAERI/RR–1329/94
DE95614370	IC–94/337
DE95614371	IC–94/342
DE95614372	JINR-E–14-94-266
DE95614373	JINR-R–1-94-298
DE95614374	KAERI/RR–1290/93
DE95614444	IC–94/272
DE95614445	IC–94/288
DE95614446	IC–94/292
DE95614447	IC–94/294
DE95614448	IC–94/329
DE95614449	IC–94/340
DE95614466	CNIC–00779
DE95614467	FRCEA-TH–424
DE95614468	IC–94/291
DE95614469	IC–94/297
DE95614478	KAERI/RR–1327/94
DE95614482	IC–94/304
DE95614483	IC–94/334
DE95614584	IA–1486
DE95614585	INIS-mf–14450
DE95614628	PINSTECH-HPD–142
DE95614629	PINSTECH-RIAD–138
DE95614822	INIS-mf–14449
DE95614900	IAEA-TECDOC–766
DE95615149	CEA-R–5654
DE95615230	UM-P–93/98
DE95615231	UM-P–94/27
DE95615232	UM-P–94/39
DE95615349	UM-P–93/93
DE95615391	UM-P–92/86
DE95615467	IAEA-TECDOC–721
DE95615468	OPRI-RM–06-1994
DE95615481	IAEA-R–6773-F
DE95615485	INIS-RU–378
DE95615486	SKB-TR–94-09
DE95615487	VF-BIO–94-5
DE95615488	PINSTECH-RIAD–139
DE95615559	INIS-mf–14447
DE95615563	INIS-mf–14451
DE95615566	INIS-mf–14454
DE95615625	KAERI/RR–1252/93
DE95615633	PINSTECH–134
DE95615634	PINSTECH–136
DE95615650	PINSTECH-NPD–136
DE95615651	PINSTECH-RIAD–136
DE95615699	UM-P–93/100b
DE95615746	IAEA-R–6328-F
DE95615771	PINSTECH-RIAD–137
DE95615810	KAERI/RR–1359/93
DE95615814	IAEA-TECDOC–769
DE95615824	INIS-mf–14452
DE95615825	UM-P–94/92
DE95615834	JINR–5-62-93
DE95615835	DTU-AEF-NT–12
DE95615836	INIS-mf–14437-Vol.1
DE95615882	IAEA-TECDOC–762
DE95615883	PINSTECH–130
DE95615899	PINSTECH–129
DE95615903	NEI-SE–183
DE95615911	IAEA-TECDOC–773
DE95615912	INIS-mf–14417
DE95615943	PSI–94-17
DE95615954	INIS-mf–14437-Vol.3
DE95615955	INIS-mf–14437-Vol.4-Pt.1
DE95615956	INIS-mf–14437-Vol.4-Pt.3
DE95615957	PINSTECH-HPD–143
DE95615958	PINSTECH–131
DE95615959	PINSTECH–132
DE95615960	PINSTECH–133
DE95615980	JINR–3-66-94
DE95616117	SKB-TR–94-11
DE95616129	SLU-REK-R–74
DE95616205	NUTEK-R–94-44
DE95616224	INIS-mf–14429
DE95616225	INIS-mf–14446
DE95616226	NKS–94-7-REV
DE95616231	INIS-mf–14448
DE95616238	INIS-mf–14437
DE95616239	INIS-mf–14437-Vol.2
DE95616243	UM-P–92/84
DE95616244	UM-P–94/09
DE95616267	UM-P–94/60
DE95616271	UM-P–94/54
DE95616272	UM-P–94/76
DE95616276	UM-P–94/24
DE95616277	UM-P–94/78
DE95616278	UM-P–93/107
DE95616279	UM-P–93/112
DE95616280	UM-P–93/75
DE95616281	UM-P–93/77
DE95616282	UM-P–93/87
DE95616283	UM-P–93/90
DE95616284	UM-P–93/91
DE95616285	UM-P–94/58
DE95616286	UM-P–94/64
DE95616287	UM-P–94/74
DE95616288	UM-P–94/96
DE95616302	UM-P–94/50
DE95616315	UM-P–93/80
DE95616316	UM-P–93/81
DE95616332	UM-P–93/106
DE95616333	UM-P–93/108
DE95616337	UM-P–94/21
DE95616347	UM-P–92/92
DE95616348	UM-P–93/84
DE95616349	UM-P–93/88
DE95616373	UM-P–94/63
DE95616383	UM-P–94/19
DE95616384	UM-P–93/117
DE95616386	JINR–6-63-93
DE95616389	UM-P–93/94
DE95616407	UM-P–94/43
DE95616411	JINR–4-61-93
DE95616412	UM-P–94/7
DE95616415	UM-P–94/33
DE95616427	UM-P–93/111
DE95616428	UM-P–94/38
DE95616435	UM-P–94/41
DE95616458	UM-P–94/17
DE95616466	UM-P–94/93
DE95616538	INIS-mf–14453
DE95616726	RISO-R–748(EN)
DE95616727	UM-P–94/44
DE95616775	UM-P–94/34
DE95616776	UM-P–94/45
DE95616777	UM-P–94/52
DE95616778	UM-P–94/55
DE95616779	UM-P–94/56
DE95616780	UM-P–94/57
DE95616903	UM-P–94/89
DE95700207	VYH-JULK–A167
DE95733338	INIS-mf–15083
DE95737228	INS–1050
DE95737518	NEI-DK–1763
DE95737519	NEI-DK–1768
DE95737520	NEI-DK–1769
DE95737522	NEI-DK–1771
DE95737524	NEI-DK–1766
DE95737525	NEI-DK–1764
DE95737554	NEI-DK–1755
DE95737555	NEI-DK–1754
DE95737560	NEI-DK–1772
DE95737561	NEI-DK–1773
DE95737562	DTU-LV-MEDD–264
DE95737563	NEI-DK–1796
DE95737564	NEI-DK–1797
DE95737565	NEI-DK–1798
DE95737566	NEI-DK–1799
DE95737567	NEI-DK–1800
DE95737568	NEI-DK–1801
DE95737569	NEI-DK–1774
DE95737570	RISO-R–785(DA)
DE95737571	RISO-R–730(EN)
DE95737572	NEI-DK–1795
DE95737583	NEI-DK–1810
DE95737585	NEI-DK–1804
DE95737586	NEI-DK–1806
DE95737587	NEI-DK–1808
DE95737588	NEI-DK–1807
DE95737590	DTU-LV-MEDD–267
DE95737592	NEI-DK–1813
DE95737593	RISO-R–762(EN)
DE95737594	RISO-R–786(DA)
DE95737595	RISO-R–714(EN)
DE95737597	KTM/E-B–155
DE95737598	KTM/E-D–202
DE95737599	KTM/E-A–5
DE95737600	VTT-TIED–1445
DE95737601	VYH-PUB–13
DE95737611	VTT-BIOENERGIA–4
DE95737615	STUK-YTO-TR–54
DE95737621	TTKK/TST–2/94
DE95737622	TTKK-LT–90
DE95737624	TTKK-LT–92
DE95737625	TTKK-LT–93
DE95737628	FAAR–23/1993
DE95737634	NEI-NO–467
DE95737635	NEI-NO–468
DE95737637	NEI-NO–469
DE95737638	NEI-NO–470
DE95737639	NEI-NO–471
DE95737640	NEI-NO–472
DE95737645	NBI-PR–160-1994
DE95737646	ECON–39/93
DE95737647	ECON–307/94
DE95737650	NEI-SE–185
DE95737652	SLU-JBT-R–93

Order No.	Report No.
DE95737653	NUTEK-FJV–94-7
DE95737654	LUNBDS-NBBE–94-1043
DE95737655	SNV–4244
DE95737656	SP–94-65
DE95737665	SEI-EED–37
DE95737666	NEI-SE–186
DE95737667	KEMI–8-94
DE95737668	LUTADL-TABK–1004
DE95737669	RVF-R–94-7
DE95737670	LUTKDH-TKKA–1001-1-164
DE95737671	LUTVDG-TVVR–1012
DE95737672	SLU-EKOMIL-R–68
DE95737673	SVF-O–97
DE95737674	SVF–521
DE95737675	SVF–522
DE95737676	SVF–523
DE95737677	SLU-EKOMIL-R–67
DE95737678	STUDSVIK-M–94-131
DE95737679	STUDSVIK-M–94-61
DE95737680	IVL-B–1167
DE95737681	IVL-B–1171
DE95737682	LUTMDN-TMVK–7017
DE95737683	LUTMDN-TMVK–7016
DE95737684	FOA-R–94-00022-1.2
DE95737686	KFB–94-9
DE95737687	NUTEK-R–94-48
DE95737795	ETDE-DE–2
DE95738042	Juel–2940
DE95738044	Juel–2925
DE95738047	KFK–5377
DE95738115	GKSS–94/E/32
DE95738116	GKSS–94/E/31
DE95738117	KFK–5365
DE95738118	KFK–5371
DE95738149	ETDE-DE–7
DE95738150	ETDE-DE–5
DE95738239	KFK–5328
DE95738270	IKE-5–240
DE95738281	KFK–5179
DE95738282	KFK–5353
DE95738329	Juel–2950
DE95738330	KFK–5327
DE95738334	IPP–6/322
DE95738354	KFK–5326
DE95738574	GKSS–94/E/13
DE95738575	GKSS–94/E/14
DE95738585	INIS-mf–15080
DE95738688	INIS-mf–15079
DE95738696	GKSS–94/E/10
DE95738699	Juel–2921
DE95738700	ETDE-DE–6
DE95738720	GKSS–94/E/7
DE95738768	KFK–5296
DE95738773	HMI-B–516
DE95738784	GSF–10/94
DE95738787	Juel–2889
DE95738824	Juel–2855
DE95738839	INIS-mf–15087
DE95738841	GKSS–93/E/78
DE95738857	Juel–2834
DE95738865	INIS-mf–15049
DE95738866	INIS-mf–15048
DE95738875	ETDE-DE–11
DE95738876	ETDE-DE–12
DE95738901	INIS-mf–15060
DE95738903	ETDE-DE–10
DE95738918	ETDE-DE–1
DE95738929	ETDE-DE–4
DE95738932	ETDE-DE–3
DE95738942	INIS-mf–15086
DE95738952	INIS-mf–15077
DE95739356	ENRESA–08/94
DE95739385	ENRESA–10/94
DE95743535	KE–93019G
DE95743536	KE–93041G
DE95743546	PSI–94-10
DE95743547	ETDE/CH-mf–95743547
DE95743548	CONF-9411177–Absts.
DE95744263	KE–93006G
DE95744264	KE–93005G
DE95744265	KE–93002G
DE95744266	KE–93006S
DE95744267	KE–93004B
DE95744268	KE–93033G
DE95744269	KE–93034G
DE95744270	KE–93005S
DE95744271	KE–93003G
DE95744272	KE–93011G
DE95744273	KE–93004G
DE95744274	KE–93013B
DE95744275	KE–93032G
DE95744276	KE–93027G
DE95744277	KE–93010S
DE95744279	KE–93008S
DE95744280	KE–93024G
DE95744281	KE–93038G
DE95744282	KE–93002B
DE95744283	KE–93035G
DE95744284	KE–93016G
DE95744285	KE–93006B
DE95744286	KE–93004S
DE95744287	KE–93017G
DE95744288	KE–93011B
DE95744289	KE–93014G
DE95744290	KE–93005B
DE95744291	KE–93003B
DE95744292	KE–93020G
DE95744293	KE–93007G
DE95744294	KE–93012G
DE95744875	NEI-NO–473
TI95004845	NYSERDA–94-20
TI95004846	NYSERDA–94-18
TI95004847	NYSERDA–94-19
TI95005546	NUREG–1435-Suppl.4
TI95005715	NUREG/CR–6214
TI95005729	NUREG–0304-Vol.19-No.3
TI95005738	GRI–94/0035
TI95006182	NUREG–1100-Vol.11
TI95006184	NUREG/CR–6136
TI95006185	NUREG/CR–6134
TI95006186	NUREG/CR–6135
TI95006187	DOE/IG–0364
TI95006619	DOE/IG–0365

Codes Used on Index Lines

Following the citation numbers in the Corporate Author, Personal Author, and Subject Indexes, codes are used to designate the type of document and the country of publication, e.g., (R;SU;In Russian). The language designator does not appear if the document is published in English.

Document Types

AV Audiovisual materials
CM Computer media
E Engineering materials
I Miscellaneous
IA Miscellaneous analytics
PA Patent application
R Report
RA Report analytic

Country Codes

AD Andorra
AE United Arab Emirates
AF Afghanistan
AG Antigua and Barbuda
AL Albania
AM Armenia
AO Angola
AR Argentina
AT Austria
AU Australia
AZ Azerbaijan

BA Bosnia and Herzegovina
BB Barbados
BD Bangladesh
BE Belgium
BF Burkina Faso
BG Bulgaria
BH Bahrain
BI Burundi
BJ Benin
BM Bermuda
BN Brunei Darussalam
BO Bolivia
BR Brazil
BS Bahamas
BT Bhutan
BW Botswana
BY Belarus
BZ Belize

CA Canada
CF Central African Republic
CG Congo
CH Switzerland
CI Cote d'Ivoire
CL Chile
CM Cameroon
CN China
CO Colombia
CR Costa Rica
CU Cuba
CV Cape Verde
CY Cyprus
CZ Czech Republic

DE Germany
DJ Djibouti
DK Denmark
DM Dominica
DO Dominican Republic
DZ Algeria

EC Ecuador
EE Estonia
EG Egypt
EP European Patent Office
ES Spain
ET Ethiopia

FI Finland
FJ Fiji
FR France

GA Gabon
GB United Kingdom
GD Grenada
GE Georgia
GH Ghana
GM Gambia
GN Guinea
GQ Equatorial Guinea
GR Greece
GT Guatemala
GU Guam
GW Guinea-Bissau
GY Guyana

HK Hong Kong
HN Honduras
HR Croatia
HT Haiti
HU Hungary

ID Indonesia
IE Ireland
IL Israel
IN India
IQ Iraq
IR Iran, Islamic Republic of
IS Iceland
IT Italy

JM Jamaica
JO Jordan
JP Japan

KE Kenya
KG Kyrgyzstan
KH Cambodia
KI Kiribati
KM Comoros
KP Korea, Democratic People's Republic of
KR Korea, Republic of
KW Kuwait
KZ Kazakhstan

LA Lao People's Democratic Republic
LB Lebanon
LC Saint Lucia
LI Liechtenstein
LK Sri Lanka
LR Liberia
LS Lesotho
LT Lithuania
LU Luxembourg
LV Latvia
LY Libyan Arab Jamahiriya

MA Morocco
MC Monaco
MD Moldova, Republic of
MG Madagascar
ML Mali
MM Myanmar
MN Mongolia
MR Mauritania
MT Malta
MU Mauritius
MV Maldives
MW Malawi
MX Mexico
MY Malaysia
MZ Mozambique

NA Namibia
NE Niger
NG Nigeria
NI Nicaragua
NL Netherlands
NO Norway
NP Nepal
NR Nauru
NZ New Zealand

OM Oman

PA Panama
PE Peru
PG Papua New Guinea
PH Philippines
PK Pakistan
PL Poland
PR Puerto Rico
PT Portugal
PY Paraguay

QA Qatar
QS INSPEC
QZ INPADOC

RO Romania
RU Russian Federation
RW Rwanda

SA Saudi Arabia
SB Solomon Islands
SC Seychelles
SD Sudan
SE Sweden
SG Singapore
SI Slovenia
SK Slovakia
SL Sierra Leone
SM San Marino
SN Senegal
SO Somalia
SR Suriname
ST Sao Tome and Principe
SV El Salvador
SY Syria
SZ Swaziland

TD Chad
TG Togo
TH Thailand
TJ Tajikistan
TM Turkmenistan
TN Tunisia
TO Tonga
TR Turkey
TT Trinidad and Tobago
TV Tuvalu
TW Taiwan
TZ Tanzania, United Republic of

UA Ukraine
UG Uganda
US United States
UY Uruguay
UZ Uzbekistan

VA Vatican City State, Holy See
VC Saint Vincent and the Grenadines
VE Venezuela
VN Viet Nam
VU Vanuatu

WS Samoa

YE Yemen, Republic of
YU Yugoslavia

ZA South Africa
ZM Zambia
ZR Zaire
ZW Zimbabwe

Codes for International Organizations

ED EANDC [European American Nuclear Data Committee]
EP European Patent Office
IO ILO [International Labor Organization]
IX IUPAC [International Union of Pure and Applied Chemistry]
QS INSPEC [Information Service in Physics, Electrotechnology and Control]
QZ INPADOC [International Patent Document Centre]
WO WIPO [World Intellectual Property Organization]
XA IAEA [International Atomic Energy Agency]
XC CERN [European Organization for Nuclear Research]
XD OECD [Organization for Economic Co-Operation and Development]
XE CEC [Commission of the European Communities]
XF FAO [Food and Agricultural Organization of the United Nations]
XH AAEA [Arab Atomic Energy Agency]
XI IIASA [International Institute for Applied Systems Analysis]
XJ JINR [Joint Institute for Nuclear Research]
XK WMO [World Meteorological Organization]
XN NEA [Nuclear Energy Agency of the OECD]
XO OAU [Organization of the African Unity]
XR ICRP [International Commission on Radiological Protection]
XS ISO [International Organization for Standardization]
XT UNIDO [United Nations Industrial Development Organization]
XU UN [United Nations]
XW WHO [World Health Organization]
XX WEC [World Energy Conference]
XY IEA [International Energy Agency]
XZ ESA [European Space Agency]

ORDER FORM

DOE and DOE Contractors: Fill in Parts I, II, and IV. **Others:** Fill in Parts I, III, and IV. Mark appropriate blanks in Part IV to indicate quantity and form (microfiche or paper copy).

I. SHIPPING AND PAYMENT INFORMATION

Ordering Address

Name _____ Telephone _____

Address _____

City _____ State _____ Zip _____

Shipping Address (if different from above)

Name _____

Address _____

City _____ State _____ Zip _____

_____

SIGNATURE (Required to validate ALL orders)

II. OSTI ORDERS (DOE and DOE contractors can order from OSTI.)

☐ Charge OSTI deposit account no. _____

☐ Charge to my ☐ VISA ☐ Mastercard

_____ _____

Account Number **Card expiration date**

Mail orders to: U.S. Department of Energy
Office of Scientific and Technical Information
P.O. Box 62
Oak Ridge, TN 37831

III. NTIS ORDERS

☐ Charge NTIS deposit account no. _____

☐ Check/Money Order enclosed for $ _____

☐ Charge to my ☐ American Express ☐ VISA ☐ Mastercard

_____ _____

Account Number **Card expiration date**

☐ Ship and Bill (see below for restrictions) _ _ _ _ _ _ _ _ _

Employer identification number (9 digits) —

Purchase Order number _____

Phone number of billing office _____
(Required for Ship & Bill orders)

Ship & Bill service is restricted to North American business locations for an extra $7.50 per order (or per Custom Search). The business' employer identification number plus the phone number of the office paying the bill are required to process these requests. A late payment charge will be applied to billings more than 30 days overdue. Prepaying, using an NTIS Deposit Account or a charge account, speeds order processing. Be sure payment and order are sent together. Checks, payable to NTIS, must be in U.S. dollars.

Mail orders to: U.S. Department of Commerce
Technology Administration
National Technical Information Service
Springfield, VA 22161

IF NO METHOD OF PAYMENT IS INDICATED, YOUR ORDER WILL BE RETURNED TO YOU AS A PRICE QUOTE UNPROCESSED.

IV. SELECTIONS

Order number _____ Report number _____

Abstract number (with vol., issue) _____

No. of fiche _____ No. of paper copies _____

Order number _____ Report number _____

Abstract number (with vol., issue) _____

No. of fiche _____ No. of paper copies _____

Order number _____ Report number _____

Abstract number (with vol., issue) _____

No. of fiche _____ No. of paper copies _____

Order number _____ Report number _____

Abstract number (with vol., issue) _____

No. of fiche _____ No. of paper copies _____

Order number _____ Report number _____

Abstract number (with vol., issue) _____

No. of fiche _____ No. of paper copies _____

Order number _____ Report number _____

Abstract number (with vol., issue) _____

No. of fiche _____ No. of paper copies _____

CUT OUT APPROPRIATE FORM AND MAIL IN A STAMPED ENVELOPE TO THE ADDRESS INDICATED.

Change of Address Form

NAME–FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE

(or) COUNTRY

MAIL THIS FORM TO:

NEW ADDRESS
Superintendent of Documents
Government Printing Office SSOM
Washington, D.C. 20402

Attach last subscription label here.

Subscription Order Form

Enter my Subscription to: _____
(Please indicate publication)

@ $ _____ Domestic; @ $ _____ Foreign.

NAME–FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE

(or) COUNTRY

☐ Remittance Enclosed (Make checks payable to Superintendent of Documents)

☐ Charge to my Deposit Account No. _____

MAIL ORDER FORM TO:
Superintendent of Documents
Government Printing Office
Washington, D.C. 20402

Federal Depository Library Program

As a result of an agreement between the U.S. Government Printing Office (GPO) and the Department of Energy, beginning in 1984 DOE reports with unlimited distribution are now included in the Federal Depository Library Program. The Regional Depository Libraries listed below receive and retain at least one copy of nearly every Federal Government publication, either in printed or microfilm form, for use by the general public. These libraries provide reference services and interlibrary loans; however, they are not sales outlets. You may wish to ask your local library to contact a Regional Depository to help you locate specific publications, or you may contact the Regional Depository yourself. Do not send checks or orders to these libraries.

ARKANSAS STATE LIBRARY
One Capitol Mall
Little Rock, AR 72201
(501) 371-2326

AUBURN UNIV. AT MONTGOMERY LIBRARY
Documents Department
Montgomery, AL 36193
(205) 279-9110, ext. 253

UNIV. OF ALABAMA LIBRARY
Documents Dept.-Box S
University, AL 35486
(205) 348-7369

DEPT. OF LIBRARY, ARCHIVES AND PUBLIC RECORDS
Third Floor-State Cap.
1700 West Washington
Phoenix, AZ 85007
(602) 255-4121

UNIVERSITY OF ARIZONA LIB.
Government Documents Dept.
Tucson, AZ 85721
(602) 626-5233

CALIFORNIA STATE LIBRARY
Govt. Publications Section
P.O. Box 2037
Sacramento, CA 95809
(916) 322-4572

UNIV. OF COLORADO LIB.
Government Pub. Division
Campus Box 184
Boulder, CO 80309
(303) 492-8834

DENVER PUBLIC LIBRARY
Govt. Pub. Department
1357 Broadway
Denver, CO 80203
(303) 571-2131

CONNECTICUT STATE LIBRARY
Government Documents Unit
231 Capitol Avenue
Hartford, CT 06106
(203) 566-4971

UNIV. OF FLORIDA LIBRARIES
Library West
Documents Department
Gainesville, FL 32611
(904) 392-0367

UNIV. OF GEORGIA LIBRARIES
Government Reference Dept.
Athens, GA 30602
(404) 542-8951

UNIV. OF HAWAII LIBRARY
Govt. Documents Collection
2550 The Mall
Honolulu, HI 96822
(808) 948-8230

UNIV. OF IDAHO LIBRARY
Documents Section
Moscow, ID 83843
(208) 885-6344

ILLINOIS STATE LIBRARY
Information Services Branch
Centennial Building
Springfield, IL 62706
(217) 782-5185

INDIANA STATE LIBRARY
Serials Documents Section
140 North Senate Avenue
Indianapolis, IN 46204
(317) 232-3686

UNIV. OF IOWA LIBRARIES
Govt. Documents Department
Iowa City, IA 52242
(319) 353-3318

UNIVERSITY OF KANSAS
Doc. Collect.-Spencer Lib.
Lawrence, KS 66045
(913) 864-4662

UNIV. OF KENTUCKY LIBRARIES
Govt. Pub. Department
Lexington, KY 40506
(606) 257-3139

LOUISIANA STATE UNIVERSITY
Middleton Library
Govt. Docs. Dept.
Baton Rouge, LA 70803
(504) 388-2570

LOUISIANA TECHNICAL UNIV. LIBRARY
Documents Department
Ruston, LA 71272
(318) 257-4962

UNIVERSITY OF MAINE
Raymond H. Fogler Library
Tri-State Regional Documents Depository
Orono, ME 04469
(207) 581-1680

UNIVERSITY OF MARYLAND
McKeldin Lib.-Doc. Div.
College Park, MD 20742
(301) 454-3034

BOSTON PUBLIC LIBRARY
Government Docs. Dept.
Boston, MA 02117
(617) 536-5400 ext. 226

DETROIT PUBLIC LIBRARY
Sociology Department
5201 Woodward Avenue
Detroit, MI 48202
(313) 833-1409

MICHIGAN STATE LIBRARY
P.O. Box 30007
Lansing, MI 48909
(517) 373-0640

UNIVERSITY OF MINNESOTA
Government Pubs. Division
409 Wilson Library
309 19th Avenue South
Minneapolis, MN 55455
(612) 373-7813

UNIV. OF MISSISSIPPI LIB.
Documents Department
University, MS 38677
(601) 232-5857

UNIV. OF MONTANA
Mansfield Library
Documents Division
Missoula, MT 59812
(406) 243-6700

NEBRASKA LIBRARY COMM.
Federal Documents
1420 P Street
Lincoln, NE 68508
(402) 471-2045
(in cooperation with University of Nebraska-Lincoln)

UNIVERSITY OF NEVADA LIB.
Govt. Pub. Department
Reno, NV 89557
(702) 784-6579

NEWARK PUBLIC LIBRARY
5 Washington Street
Newark, NJ 07101
(201) 733-7812

UNIVERSITY OF NEW MEXICO
Zimmerman Library
Government Pub. Dept.
Albuquerque, NM 87131
(505) 277-5441

NEW MEXICO STATE LIBRARY
Reference Department
325 Don Gaspar Avenue
Santa Fe, NM 87501
(505) 827-2033, ext. 22

NEW YORK STATE LIBRARY
Empire State Plaza
Albany, NY 12230
(518) 474-5563

UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL
Wilson Library
BA/SS Documents Division
Chapel Hill, NC 27515
(919) 962-1321

UNIVERSITY OF NORTH DAKOTA
Chester Fritz Library
Documents Department
Grand Forks, ND 58202
(701) 777-2617, ext. 27
(in cooperation with North Dakota State Univ. Library)

STATE LIBRARY OF OHIO
Documents Department
65 South Front Street
Columbus, OH 43215
(614) 462-7051

OKLAHOMA DEPT. OF LIBRARIES
Government Documents
200 NE 18th Street
Oklahoma City, OK 73105
(405) 521-2502

OKLAHOMA STATE UNIV. LIB.
Documents Department
Stillwater, OK 74078
(405) 624-6546

PORTLAND STATE UNIV. LIB.
Documents Department
P.O. Box 1151
Portland, OR 97207
(503) 229-3673

STATE LIBRARY OF PENN.
Government Pub. Section
P.O. Box 1601
Harrisburg, PA 17105
(717) 787-3752

TEXAS STATE LIBRARY
Public Services Department
P.O. Box 12927-Cap. Sta.
Austin, TX 78753
(512) 471-2996

TEXAS TECH. UNIV. LIBRARY
Govt. Documents Department
Lubbock, TX 79409
(806) 742-2268

UTAH STATE UNIVERSITY
Merrill Library, U.M.C. 30
Logan, UT 84322
(801) 750-2682

UNIVERSITY OF VIRGINIA
Alderman Lib.-Public Doc.
Charlottesville, VA 22901
(804) 924-3133

WASHINGTON STATE LIBRARY
Documents Section
Olympia, WA 98504
(206) 753-4027

WEST VIRGINIA UNIV. LIB.
Documents Department
Morgantown, WV 26506
(304) 293-3640

MILWAUKEE PUBLIC LIBRARY
814 West Wisconsin Avenue
Milwaukee, WI 53233
(414) 278-3000

ST. HIST. LIB. OF WISCONSIN
Government Pub. Section
816 State Street
Madison, WI 53706
(608) 262-4347

WYOMING STATE LIBRARY
Supreme Ct. & Library Bld.
Cheyenne, WY 82002
(307) 777-6344

Order Number Correlation	Report Number Index	Contract Number Index	Subject Index	Personal Author Index	Corporate Author Index